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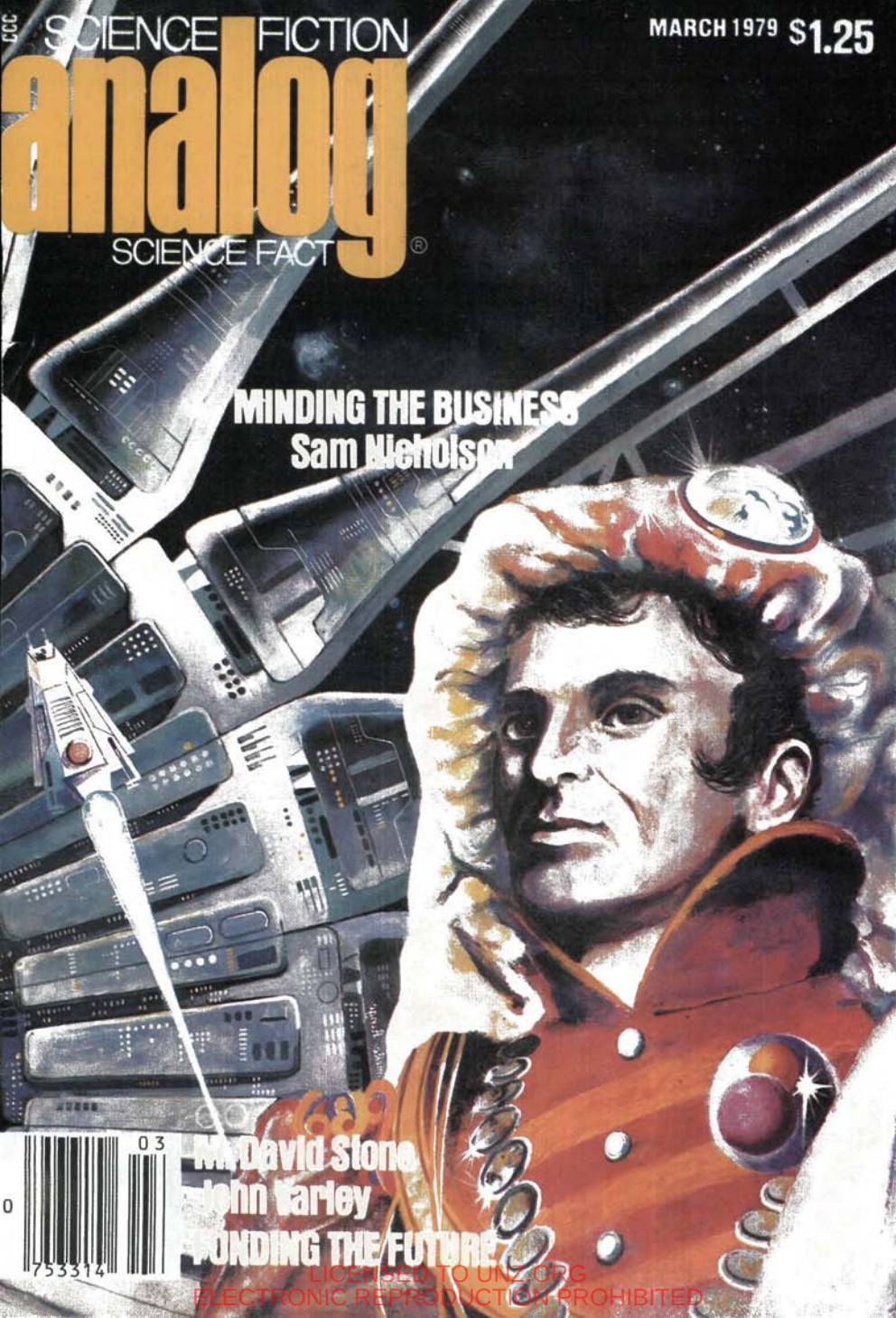

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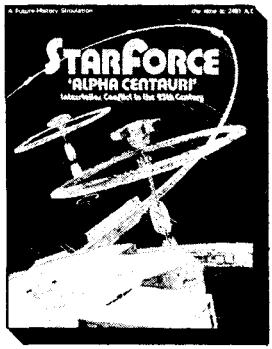

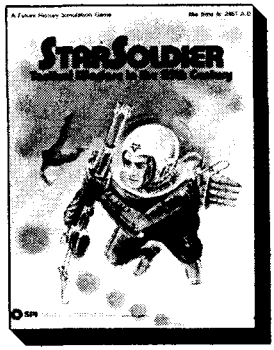

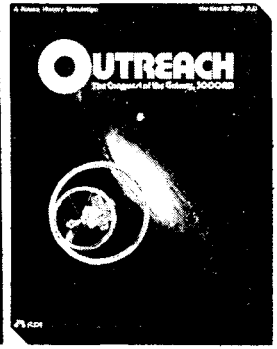

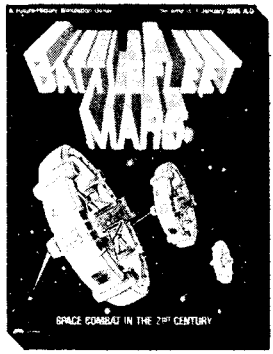

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GUEST EDITORIAL

Stephen A. Kallis Jr.

defining the limits

The world of technology frequently produces more than new gadgets to make our lives easier: it also produces new legal problems to make our lives more complicated. Before the arrival of artificial heart/lung machines and coronary transplants, the definition of death was very simple: a person was dead when his or her heart stopped. Now, there are learned debates on the subject, and "brain death"—total cessation of cerebral activities—is on the way to supplanting that ages-old definition, bringing with it a series of complicated lawsuits, the concept of "living wills" permitting doctors to pull the plug on patients who cannot exist alive (?) without external devices, and so forth.

One area that recently has become a real mare's nest is in broadcasting. Particularly with regards to censorship. "Censorship" in its operative sense is a mechanism where a message is filtered so that certain of its elements are suppressed so as to conform to some established level of acceptability. The same may be said of an L-C circuit in an audio line, except that the filtering action of the circuit, once assembled, isn't arbitrary, whereas censorship (and most other legislated laws) are.

What brings this into focus is the recent Supreme Court decision of the "Seven Dirty Words" case. The Federal Communications Commission, for reasons to be discussed below, has among its regulations rules concerning what sort of broadcast material is unsuitable for public broadcast (and for the moment, let's not consider the moral imperatives of such rules). A comedian, on a recording, did a humorous sketch on "the words that cannot be broadcast," in which the words were spoken. A radio station, despite the fact that in the sketch the comic warned that the words could not be aired, played the record over its facilities. The resulting case wound up in the Supreme Court. The real question: did the FCC have a right to impose such rules? The lines were drawn as freedom of speech versus invasion of privacy, and the result—still a bit perplexing—is that the FCC does have the right to impose some

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such rules, does have the right to penalize those breaking regulations after the fact, but does not have the right to prescreen the material before broadcast (also, there's a time factor: what may be permissable at 2:00 AM may not necessarily be at 2:00 PM; but it's confusing enough without bringing that up).

Now, this decision is very important to broadcasters because of a fact of physical life: there is not enough room on the "public airways" for an infinite number of stations. There are finite limits to the bandwidth of AM, FM and television sections of the electromagnetic spectrum. Further, each transmission requires a bandwidth around its carrier, and stations in close proximity could have overlapping signals if not separated either by frequency or some other limitation such as signal strength.

Given this situation, there are in any particular geographic area only so many stations broadcasting. And since broadcasting can be a profitable field, there are areas in which there are more people wishing to broadcast than there are available stations. As a result, broadcasters currently holding licenses are all too aware that there are others hoping that they can make a case that the broadcaster's behavior is sufficiently "against the public interest" so that their license would be revoked. The have-nots cannot grab at a license unless one of the haves loses one.

Now it is a fact of *legal* life that in the United States there are no absolute rights, which is why there are constitutional lawyers and Supreme Court decisions. For example, absolute freedom of the press would preclude the defendant in a trial, in some cases, from getting a fair and impartial trial. It is this balancing of interpretations that led to the "Seven Dirty Words" decision.

Given that the FCC can impose penalities upon stations broadcasting in other than "the public interest," and that the precise limits of what steps beyond the "acceptable" are vague, stations will tend to police themselves. And given to their sensitivity to their vulnerability, stations may tend to overreact. Censorship, indeed; but self-imposed censorship.

To give an idea of how far this business goes, in the old days before television, radio executives were afraid of certain words, not unlike the Victorians, particulary those concerned with parts of the body. One of the tabu words was "belly" (marvelously skewered by Jack Benny: on one show, the master comedian said that one of the songs from the then-new show, *South Pacific*, because of regulations, could only be referred to as "stomach Hai"). By the age of television, of course, people were *much* more enlightened, of course: on the show *I Dream of Jeannie*, the middle-Eastern costume the female lead was to wear was decreed by network brass to have to conceal her navel. Now, of course, I have never seen Barbara Eden's navel, even in a photograph but there have been no reports that would lead one to

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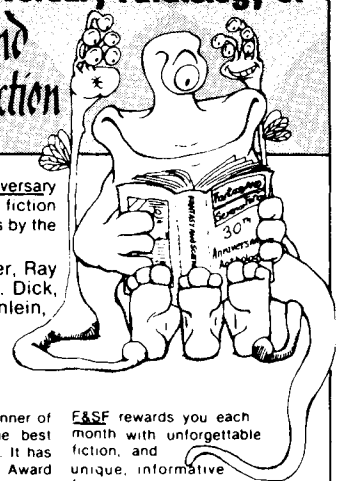

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believe that there is anything unusual about it: again, neo-Victorian overreaction. And even just a few years ago, the navel menace was still with us—with regards to the then-upcoming *Cher* show, network bigwigs debated whether the star of the show could expose her navel (with the wisdom worthy of Solomon, they decided that she could bare her navel as long as she didn't talk about it. Her agent was reported to have said. "It's just as well they let her: it's the only cleavage she's got.") Interestingly, during the same time everyone was worrying about navels, news programs were showing bare breasts—both in shots of peasant Oriental women at work in rice paddies, and in news items about breast examinations in cancer checkups—without complaint or qualm. Again, the problem with selfimposed censorship is that it is arbitrary, and frequently overdone.

The obverse of selfimposed censorship is externally imposed censorship. This has been tried, with little success, in the motion picture industry. There was the Hayes office, the Legion of Decency, etc . . . and the only thing that seemed to work at all well was the G, PG, R, and X rating program, which is strictly labeling; not messing with content. (This does work in reverse, however: a producer can "X-rate" his own film; and this may be done if an otherwise turkey might make more money by being shown to unsuspecting porno freaks.) The ratings are arbitrary, but it's a better way.

Perhaps this may work with films, but not with broadcasting. Particularly in such phenomena as "talk shows," where a high degree of audience participation is mandatory. If a call-in participant is permitted to go out in real-time, the broadcast conversation could contain anything. (Most of the "seven dirty words" take about 0.5 seconds to say; the reaction time of the average human being is 0.75 seconds, permitting at least 1.5 dirty words before the talkmaster could hang up.) So for the protection of the station, a built-in time delay is provided for talk shows courtesy of a· tape-recording loop. The audience hears the conversation some 15-20 seconds after being uttered; in case of a "dirty word," a station "producer" can push a "panic button" that either produces silence over the airways, or a repeating signature, such as a station identification.

The trouble with this approach is that, like most censorship, it is second-level arbitrariness (i.e., a station person trying to second-guess what the FCC will think). One very good Boston talk show let conversation concerning the habits of men having sexual relationships with sheep go through, yet bleeped out the relatively innocuous "Spock is only Vulcan from the waist up," when talking about the *Star Trek* science officer's possible romantic drives.

For dramatic shows, and other scripted ones, the censorship problem could be eased, at least, by eliminating some of the arbitrariness. One proposal is to standardize the whole matter,

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perhaps by the American National Standards Institute. By deriving tables of dirty words (including "borderline cases") an ANSI-standard DW-1978.XX could at least keep broadcasters from trying to second-guess the Feds.

Imagine the possibilities! Each broadcaster could receive a copy of the Standard (in a plain, brown wrapper), and be forewarned. Book publishers and other media, who might feel a bit squeamish about publishing a particular word, need not fall back on "explitive deleted," or in some cases the even less satisfactory "%#$#@!"; a simple reference to the appropriate table could be substituted, for those who really care.

The true "dirty word freak" can get his or her jollies by reading the Standard, perhaps saving forests of trees from being converted into dirty books—perhaps even minimizing grafitti.

For live shows, of course, this technique is very limited. Even the best producers cannot be expected to run through a full, cross-indexed Standard in only 17 seconds; so something else should be done.

Well, once the Standard has been established, the problem becomes a simple one of applied technology. There are already a few voice-response computers, although these only have limited vocabularies. One of these, appropriately programmed, could be coupled to the audio line, checking words against the Standard. Since the average computer operates in microseconds, the delay time could be considerably less than 15 seconds.

The addition of a computerized "filter" produces an interesting secondary solution. As is relatively common knowledge, almost every "dirty word" or phrase has a socially acceptable substitute. "Make love" is a euphmism for that lovely little Germanic four-letter word beginning with "f" (see? I played a trick; I referred to the word without saying it: QED). Some substitutes are medical terms (e.g., fellatio). Some can either be abbreviated ("S.O.B.") or spoken synonymously ("male puppy").

A few computer systems can create words, or phonetic groups (some have been used in banks for telephone-deposit transactions). With a reaction time of microseconds, a computer could in theory replace a "no-no" with an acceptable substitute.

One question that might arise would be the nature of the substitute word. The word "shithead," for instance, could either be transliterated into "fecalpate" or "dungdome," or it could be transformed into "meathead," which perhaps more follows the intent of the phrase. Maybe *that* decision would have to be standardized.

Come to think of it, the same technique could be used for television's live shows—unless the viewers happened to be lip-readers. Reconstructing a television picture would be asking too much. Wouldn't it?

Technology taketh away, and technology giveth. ■

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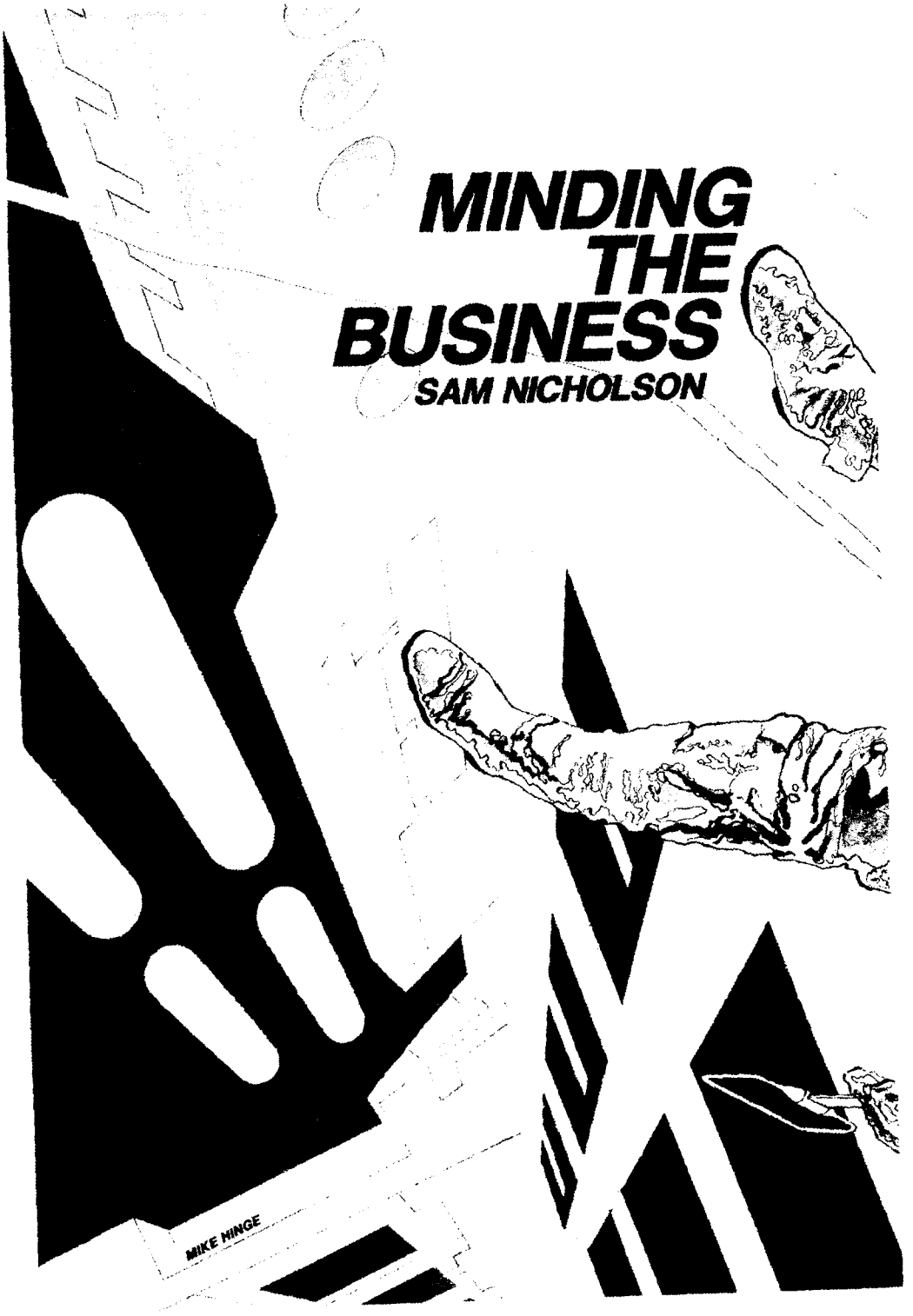

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Murder's the thing Bard, but how?

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George Apfelstein—most elegantly-clad member of the Sol/Proxima theatrical set and (more to the point) manager of Vardos Vayan, Bard Laureate—summed up his tailoring bills on his wafer computer and decided that his valuable property had better produce another Epic.

The Bard's *Waystation Trilogy* had burst like a glorious nova upon the dramatic scene—but that had been several years ago. What, Apfelstein asked himself, had Vardos done lately? Since returning from that twelve year tour of the Proxima Circuit, during which he had developed from a *student Thespian to Bard Laureate*, Vardos had written a few trifling comedies and had amused himself as Player/Director of his own repertory company. It was high time he went back to work!

The Bard Laureate's troupe was playing New Frisco's Theater Rotunda, which perched by itself on a cliff overlooking Post-Glacial-Melt waters, at the edge of the San Andreas Deep. New Frisco's crystal hives lay to the east and north, while suburban residences, like lily pads, floated on the California Sea.

As in most Theater Rotundas, Thespian quarters were cubicles spaced around a pilastered gallery at the base of the dome. Apfelstein consulted his antique jewel-work timepiece and reflected he could beard the lion in his cubicle before Vardos went to his dressing room to prepare for the evening's performance.

Vardos Vayan was, in fact, more tiger than lion. His gentle manners could suddenly show muscle and claw, all the more deadly for being quiet. In addition to his work as Bard and Thespian, Vardos was a Guardian of the Dhaulagiri Star-Launch Track, an undercover agent used by Security when they wanted no tales told.

However, on this particular evening Vardos, dressed in a leisure jumpsuit, had coded the cubicle's DM console to replay a drama from a rival company, and he was watching in critical assessment, propped up on the bunk, when George Apfelstein's knock and entrance interrupted him. He clicked off the DM and said in surprise, *"What, here? Gloom-faced, dark-browed? Thou hast not dined?"*

Apfelstein plumped himself into the cubicle's only chair and said, "You can't afford to rest on your laurels, Vardos."

"You can't afford my resting, George," smiled Vardos, "and we've been covering expenses nicely."

"You've been running on momentum. It can't last. The Waystation Trilogy represents your Early Period. In this Middle Period—"

"Early Middle."

"—you've written nothing *epic*. You're capable of more serious drama than you've been putting out."

"Capable, perhaps—but you don't give me *time*, George! When I wrote the Trilogy I was in space. After playing a Waystation I had weeks to myself on the starship, before Old Joe Humber called rehearsals for the next performance. But you've got me book-

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ed solid for three years. Do you want to cancel the bookings?"

"No!" howled Apfelstein.

There was a silence. Vardos said, "Look here, Waystation Two is celebrating its Centennial in the next Earth year. I'd like to help them celebrate—and I could concentrate on the starship—but the tour would mean a year's absence from Earth."

"You can't do it," declared Apfelstein. "The troupe couldn't last a year without you. Why, we have a hard enough time finding understudies for the few performances you miss!"

"A succession of guest stars could keep the box office up," mused Vardos, "and we have an itinerant Thespian in our company who could play my roles brilliantly, if he would stay a year with us."

"Who?"

"Tom Tomas."

"What! The Vestan? The Asteroid hobo? He's a character actor, a comedian—"

"He's a gifted Thespian who needs no direction. He has an instinct for place and timing. I feel honored that he seeks employment with us during his wanderings—and is satisfied with the small roles I can give him, since our company is complete as to the major parts."

"Well, offer him your roles for a year. He'll snap the offer up!"

"Thespis knows I've offered him any roles he wants, if he'll stay a full season. But he seems to have family duties on Vesta."

Apfelstein straightened up and gave a no-nonsense jerk to his satin cummerbund. "If you have to be in space to write an epic—and if you have to get Tom Tomas before you can be in space—then stop lazing around and *get Tom Tomas*!"

"Now?"

"Anything wrong with now?"

Vardos sighed, rolled lithely off the bunk, complained, "I wish you'd stop living beyond my means, George," and ambled off to find Tom Tomas.

He knocked on the door of Tomas's cubicle, received a "Come in!" and entered. He laughed at arriving while the Vestan was viewing the same drama he had been watching.

"Bard Laureate!" exclaimed Tomas, blacking the DM and half-rising from the bunk.

"Sit—I pray you," smiled Vardos, dropping into the chair. He gestured to the dark tube. "A paltry performance."

"Yes, we do the drama better."

Tom Tomas was, like the Bard, in his early thirties. However, he lacked the Bard's vivid good looks. Tomas was of average build, pallid of skin and pale of personality. Costume and greasepaint transformed him into—anybody. Vardos scarcely knew how to talk to him, because he had no clue as to the man's reality. He began.

"These past three years I've sought to hire you as a full-time Thespian. Now I'm asking you to do me a favor. Waystation Two will have its Centennial this coming year. As the first of the genuine Waystations—"

"Your pardon, Bard. Waystation

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One at Vesta was the *first*."

"But Vesta is at Earth's threshold. Waystation Two is the first in the six-months-apart chain. *Trail Blazer*, it calls itself—the forerunner of *Twinkle Town, The Blue Grotto, Roseland*, and all the rest—and I'd very much like to join the Centennial party. The problem is—an understudy."

"I doubt that anyone could fill your roles to the public's satisfaction, Bard."

"*You* could, Tom. You could be me—and more than me. I beg you—consider arranging your Vestan affairs so that you could serve a year in my troupe."

The man seemed to shrink against the bunk pillows. His face became paler, more vague. He put his hand to his cheek and flipped his little finger back and forth across his nose. "I—I thank you—but I couldn't."

Curious at this reaction, the Bard continued, "Why not?"

Pulling at a lock of hair, Tomas said, "Family values must come before personal ambitions."

"What family do you have?"

"My mother—a widow—and an older brother. They farm an axlecollar near Vesta—four collars on the axle. My father bought the collar thirty years ago, and we've farmed it since. My mother relies on me—"

"I understand," said Vardos doubtfully. His own parents had died of a space-lab virus when he was at school, but he could not imagine his mother holding him back from the tour to Proxima Centauri. She had been enthusiastic about his space interests and—even widowed—would have been the first to rejoice in his being accepted by Joe Humber for the Proxima Circuit.

Vardos said, "Is there no way your older brother could manage without you? I'm offering you a year at top salary—"

Tomas's eyes flickered and could not meet the Bard's. His finger once more flipped back and forth across his nose. "Family values must come before—"

With a cold chill along his spine, Vardos realized he was watching a *programmed* man. Brainwashed—hypnotized. Without changing tone, Vardos went on, "And star billing, of course, two parts chlorine threaded through the blodget—"

"A very generous offer—and I thank you, Bard, but family values—" repeated Tomas mechanically.

Vardos did not know how much pressure the man could take, and he did not want to break him down. The job offer obviously had presented an inhuman stress. Vardos rose from the chair. "You'll be with us, then, for the Gala on Vesta?"

"The Gala?" The stress visibly relaxed. Tomas struggled away from the pillows. "Yes, I'm looking forward to the Gala. Did I tell you my family farms a collar outside Vesta?"

"I believe you've mentioned it," said the Bard. "Perhaps they'll attend the Gala."

Tomas was still trying to get to his feet, as if his mind had gone back to

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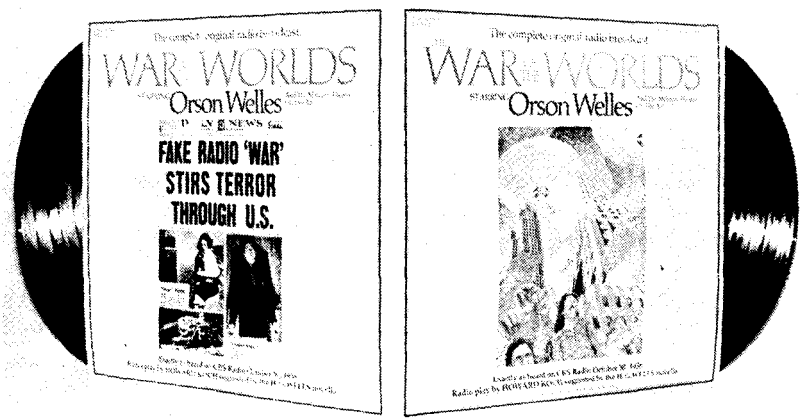

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the Bard's entrance. Vardos smiled, "Please don't trouble—"

He bowed himself out and returned to his own cubicle. Apfelstein had gone, and the Bard dropped into the chair. What could be done about Tom Tomas? Who had so criminally blocked a portion of the Vestan's fine brain?

Criminally—yes, there must have been *criminal* intent. Men were seldom brainwashed just for the fun of it. Tom must have been programmed into a crime—a swindle—an illegal activity for *gain*.

Vardos thought a moment, rose, opened his dressing case, took out his Security scrambler and inserted the scrambler behind the communications panel of the DM console. He tapped out a code, and waited.

The DM tube flimmered, then cleared to show the image of a gray-haired, blunt-jawed man in a blue-and-gold uniform.

Vardos smiled, "Good day, Colonel—I assume it is day, atop Mount Dhaulagiri."

"Vardos," grunted the Colonel. "Another Security matter for us?"

"Security, no. At least, the subject has no Security contacts I know about. Colonel, a friend of mine is—I believe—being used for some sort of criminal activity—but I don't know where, what, or how."

"Tell us what you've got. We'll see what correlations the No Fault computers can give us. Wait—I'll put you on direct In-Feed . . . All right—now recording."

Vardos began, "Tom Tomas, itinerant Thespian. Clains mother and elder brother farming an axle-collar in Vestan space. Tomas apparently has been programmed to a definite departure-and-return schedule from Vesta. He *must* return to the collar at a specific time."

The Colonel cut in, "Any clue as to the programmed routes?"

"No idea. Tom seems familiar with both starship and pleasure cruiser schedules."

"Travels under his own name?"

"Well, Colonel, if his family has been, as he claims, on Vesta for a generation, he must arrive and depart as himself. His programmers could not risk having an old friend greet him on the starship ramp with, 'Hi, Tom! What are you doing behind that false beard?'

"And perhaps," continued Vardos, "the whole scheme is based on the fact that Tom is a well-known Thespian who travels in the course of his work."

"That's all you have?"

"Absolutely all—except I'm convinced Tom has no awareness of the programming or its purpose." Vardos paused. "How soon can I have the correlations?"

"Depends on the No Fault backlog. You're booked on next week's Dhaulagiri lift-out, aren't you? A Gala on Vesta, or some such?"

"Yes. Part of the Gala package was a free round trip on a pleasure cruiser, but our freight has to go by starship, so I decided to take the short express

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hop with it. I frankly don't have time for a week aboard a Moon/Vesta cruising casino."

"Stop at my office before you board the starship. Your data is sparse, but maybe the computers can toss it back and forth and come up with correlations by next week."

Vardos would have liked quicker action, but he realized the Colonel was stretching his authority over a doubtful area when he assisted in criminal investigations that probably had no connection with Security.

At the end of the New Frisco engagement, George Apfelstein and the troupe boarded a Moon shuttle with their limit of personal luggage and proceeded in good spirits to their rendezvous with the Vestan pleasure cruiser on the Moon.

Vardos and the company's freight took a supersonic charter flight to the tourist enclave at the base of Mount Dhaulagiri in the Himalayas. The enclave hotel was emptying as the thousand starship passengers were processed and sent up the mountain lift-tube to board the starship.

Vardos, having Security clearance, stayed with the freight and accompanied the container topside in the freight tube. The vast underground loading chamber was below the lift-off track, and Vardos had to follow an access tunnel to the side of the launch area before reaching the lift to the starship control center.

The Colonel was at his desk in an office which had a wide viewport looking down upon launch operations. The starship, a huge bat-winged monster, was poised on the track, her stern tubes enclosed by the "gamma-catcher"—an amphitheater of ducts that attracted and held the radioactive blast emanations.

As usual, jet-winds were sweeping head-on against the nose of the starship. It was against these winds that she would lift out, building speed in her nuclear-cartridge engines, without the body-crushing G's of a vertical blast-off.

"Vardos! Good to see you," grunted the Colonel, half-rising to shake the Bard's hand. "Sit-down—sit down. Very curious information we have for you."

Vardos—who, for this semiofficial meeting, had donned a new travel jumpsuit and affixed his Sol/Proxima Dual Citizen badge—sat in the indicated chair and grinned across the desk at the Colonel, "Programming a Thespian must be a curious procedure, we all are so many characters."

"Characters, you can say again," muttered the Colonel. "However—" he drew a summation pad from the clutter on his desk, "—here are the facts on Tom Tomas. His father, in truth, *did* buy the farm collar about thirty years ago, after quitting as a technician on Waystation Two. Nothing against Tomas—apparently had saved a wad of credits, heard of the available collar through the tachyon-Morse property lists, and got his bid for it accepted.

"Before he left Waystation Two, he

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had married a widow with a son. Tomas himself had been married and left with a youngster—your Tom—and apparently married again to get a mother for the boy, not wanting to put him in a foster home on Vesta while he farmed the collar."

"So the mother and elder brother are no relation whatsoever to Tom!" exclaimed the Bard in surprise.

"No relation at all—and Tom can be glad they're not!" barked the Colonel. "A pair of bad eggs! Vestan police have always felt they killed Farmer Tomas, although no evidence was available on the collar. Space accidents—systems failures—air blowouts—a damned high percentage of 'em are unproved murders!

"Your Tom Tomas was ten when his father died, and he stayed on the collar until he was eighteen. He must have been the farm workhorse. The crops went to hell when he left."

"What did they grow?" asked Vardos.

"Zone One Temperate above-soil crops—cabbage, cauliflower, beans, broccoli, and so on. Went to hell in a handbasket."

"I don't understand how anybody could wreck a cabbage," mused Vardos.

"That's because you're a Bard-dreaming Thespian. Speak to an Agronom sometime," snorted the Colonel. "Well, young Tom had always been keen on history and drama—studied test/tapes, of course, on the collar—and when he was eighteen he gave his stepmother the slip and headed for Earth. Studied drama for several years—played in the DM Continuals—"

"Why did he return to Vesta?"

"Because the Agriculture Board called him back, that's why! Because the collar wasn't producing and hence was liable for forfeit! The Asteroids need every gram of food the collars produce! If a collar is idle, the owner has to sell out to somebody who'll farm. That old bitch and her slob of a son had let the plant go to wrack and ruin, despite all the experts sent to help them.

"And when the forfeit order went out," continued the Colonel, "The Board discovered that Dame Tomas never had owned the collar! Old Tomas had bought it in his son's name, and at his death the collar had gone into wardship until Tom was twenty-one."

The Bard raised his eyebrows. "So they had killed Farmer Tomas for nothing!"

"Young Tom was lucky. If that pair had got their hands on the collar, he would have followed his father in another 'accident.' But if Tom had died, the pair would have been evicted by wardship, so they had kept him alive.

"But naturally, they had no interest in maintaining Tom's property. They let it run down until—as I say—the Board issued the forfeit order about ten years ago, and Tom came back to Vesta."

"Ten years ago he became an itinerant Thespian," interposed the Bard.

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"*Family values*—it was the step-family who blocked Tom's brain! They murdered his father, and now—?"

"The computers have no data beyond the forfeit hassle."

"What about possible crime correlations?"

"Negative. Nothing."

"What!" exclaimed Vardos. "There *must* be a correlation between Tom's wanderings and various unsolved crimes!"

"Upon reflection, I agree. Since the crop yields undoubtedly are minimal, how have the pair on the collar been supporting themselves—except by crime? But they were clever enough to kill Tom's father without being caught—and they're no less clever about the skullduggery that's now involving Tom without his own knowledge.

"You see," added the Colonel, "a guilty man subconsciously leaves traces because of the psychological fact that he knows he's guilty. Your friend Tom leaves no traces because he *is* innocent."

"Can a person be programmed to commit crimes against his will?"

"I'd guess Tom to be a courier—a link with an Earth organization. You're headed for Vesta—see what you can dig up. A lot of information doesn't get fed into computers."

Vardos thanked the Colonel and took his leave. Something had been overlooked, he reflected. There *had* to be a correlation.

Vardos boarded the Vesta/Transient deck of the starship for the minimum-speed overnight trip. The deck was of convertible components. After the Asteroid passengers had disembarked the next day at Waystation One, the salons and sleep-cubicles would be re-fashioned into nurseries and schoolrooms for the children aboard—and for the children who would be born during the 5.5 years along the Waystations to the four Proxima planets.

The starship was a *city*, with a personal mobility undreamed of by early space planners. Thanks to instantaneous tachyon-Morse communication, the ship was in constant touch with the entire Sol/Proxima network. Crew and passengers alike moved into a starship as Pre-Melt workers moved from one Earth city to another—wives, children, bag and baggage. In fact, it had become the custom for the young-marrieds to start their families aboard, where the relaxed, culturally-rich atmosphere was ideal for young minds.

In hobby clubs and study groups, the passengers bartered information—philosophers discoursing to plumbers, and plumbers showing philosophers how to put water systems together. There were tachyoned text/tapes for serious education, and dance groups, glee clubs, orchestras, bands, and repertory companies for leisure hours. Parents and teachers cooperated in manning the nurseries and schoolrooms, and starship babies became unusually well-balanced, outgoing individuals.

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For the crew, also, the mobility was as great as on a planet. An eighteen-year-old Apprentice could, if he wished, remain for the 33+ years of three Sol/Proxima voyages. He would study engineering or navigation, with a view to staying within the starship service. Or, with new interests awakened by lectures and study groups, he might choose another career entirely, and after free-time text-tapes step ashore at a Proximan planet as a fully-qualified Agronom or Market Analyst. Even senior officers, attracted by executive jobs on the Waystations, could resign in midtrip and relocate, being replaced by eager young juniors.

The Waystations were thus the circulatory system for the starships. Every six months a percentage of both passengers and crew changed because of the continual job mobility. As the Wheels were extended into axles with more and more collars, the Waystations became diversified into more than food sources. Their "dust-sweepers" caught interstellar particles and combined them with raw materials delivered from Sol or Proxima by cargo robots, and the collars manufactured textiles, ultrapure Outer Space glass, silicon chips and the other infinitesimal parts for high-accuracy instruments.

Everywhere along the Circuit were flowers. Babylon's Hanging Gardens paled beside the masses of flowers transplanted into space structures from five planets. As the Bard ambled through the salons on the Vestan deck of the starship, he saw new varieties of Proximan airplants and ferns, and more gorgeous Earth orchids, which thrived like weeds in the pure starship air.

The alcove which would tomorrow become a Punch and Judy theater for children was now a refreshment bar for the Vestan passengers. Vardos secured a flagon of Beatan honey-wine. Sparkling and festive, it was a good drink for special occasions although not (in the Bard's opinion) as solidly satisfying as Waystation One grape.

He took flagon and glass to a bower-enclosed recliner, settled back and considered what had failed in the crime-correlation process. Any physical event had to leave traces. Had they no clue at all?

They had, he thought, one clue. Tom's father had been murdered *cleverly*. Was it unreasonable to assume the same *cleverness* was being awakened by lectures and study groups, he might choose another career applied to the current crimes? The first order of business on Vesta was to reexamine that murder.

No. The first order of business, amended the Bard, was to talk to the Widow Tomas and her son.

Having reached this decision, the Bard put Tom Tomas out of his mind and considered the menus and after-dinner entertainment offered by the several salons. The choice was a hard one, so excellent were the possbilities, but the Bard chose the dinner theater and a play.

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The next morning the starship slid into the docking slot at Waystation One, the wheel floating outside the sand-bright little planet Vesta. Vardos took the shuttle to Vesta's Transport Dome, edged past Tourist Reception and boarded a flyover to the dome holding the civic offices.

The dome colors were dawn, and matins were ringing on the carillon. Vestans, who started work early in their artificial day, were hurrying into the civic offices rising from flower-and-fountain courtyards.

The Agriculture Board had a two-storey building to itself, with plant-ringed balconies and a thatch-appearing roof. The Chief Agronom had just fitted his ample form into his desk chair when Vardos was announced.

"Bard Laureate!" exclaimed the Chief. "Please sit down. You're here for the Gala, of course! What can we do for you?"

Vardos sat in the reception chair. "You could give me information, Chief. You know that Tom Tomas is a member of my company, don't you?"

"Yes, indeed! A fine man, Tom. A credit to Vesta. His parents were Vestans, although his father had a job on Waystation Two for some years. We've been rather hoping, Bard, you'd give Tom a permanent position with your troupe."

"There's nothing I'd like better," smiled Vardos, "but I understand the Agriculture Board insists he comes home to farm every year."

The Chief ducked his plump jowels behind his wide cravat. "It's true that

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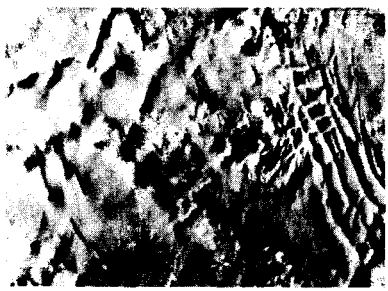

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his property is forfeit unless it's farmed—but why can't he demand that his stepmother and that hulking son of hers either farm or get out?"

"What's his stepbrother's name? Perhaps I should pay him a courtesy visit."

"Don't even think of it! Wolf Woldan is a surly brute, and Dame Tomas is a witch. So help me, Bard!"

"Oh? Was Farmer Tomas killed by witchcraft?"

"System failure—but it looked like witchcraft because he was alone on the collar when he died. Wolf had got into a scrape on Waystation One—all the Asteroid riffraff collect in the bars on Waystation One—and his mother went by space cab to get him out of the Detention Unit. Young Tom promptly scooted to visit the next collar on the axle—a farm owned by a family named Eglantine. The kids were friendly, but Dame Tomas never liked Tom to visit neighbors.

"Well, sir, about an hour after Dame Tomas had left, the fire alarm sounded on all the collars. Tom and the Eglantines ran to the indication box—and there was the Tomas collar showing blow-out red in all sections. Owner Tomas didn't have even a split-second chance.

"Since you're a spaceman yourself, Bard, you know that space structures fight fire with oxygen-exhaustion rather than with chemicals or water. The unit containing the fire is sealed, and the blow-out valve is released. *Unless* the unit doors are sealed, the valve won't activate—an obvious precaution against blow-out while injured personnel are still being removed from the unit. However, on the Tomas collar, *all* the valves blew simultaneously.

"Tom was in a frenzy—poor kid—but Dame Eglantine kept him quiet while her husband put on a space suit and went to see what had happened. The other neighbors had come also, and they found what was left of Tomas, in a seedling section."

"And no evidence of murder?"

"Well, Bard, all electronic systems in space—and elsewhere, I guess—are enclosed in antijamming fields. They can't be set to go off, like a bomb. Dame Tomas, for example, could not have aimed a disruptorbeam from outside the collar. The valves had to blow from simultaneous *inner* malfunction. A typical system failure."

Vardos remarked, "If Tom had not gone to visit the Eglantines—"

"Oh, there's no doubt he was supposed to die with his father. And all the time, the property was in wardship—although we here in Agriculture didn't realize it until we had to get the forfeit order from the courts."

Vardos pondered. "I keep coming back to your statement that Dame Tomas is a witch. Literally, a witch?"

The Chief wheezed and looked baffled. "The Tomas murder wasn't the only mystery. Shortly after the blow-out, the neighbor next to the Eglantines died when a tank of fertilizer chemicals exploded. Again, a system failure. The police wondered if he had

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seen anything on the Tomas collar—but he hadn't *reported* anything—"

The Chief moved uneasily in his chair. "It could have been accidental—but only last year the Eglantine son who was Tom's friend died when the life-support systems failed in his space van."

"A long time after the first murder—over twenty years, wasn't it?"

"Yes, but something kept nagging at Nick Eglantine. Meta—his wife—told him to let things be. They had two little boys, and Meta was afraid. Meta worked in our department, and what she could tell you about Dame Tomas—!"

"Would she talk to me?"

"Frankly, I don't know. She's been mighty quiet since Nick died. Lives on Vesta with the kids. Nick was an electrical inspector in Construction Control. If you asked her, she'd probably take you out to the collar and introduce you to the Eglantines."

"More likely, if *you* asked her, Chief."

"I don't know," repeated the Chief. "I can try to get hold of her. Where are you staying?"

"I hope they can accomodate me at Thespian quarters in the Pleasure Dome." Vardos rose. "Chief, if the old woman's son, Wolf Woldan, had connections with Earth criminals, could he meet them on Vesta—or on Waystation One?"

The Chief hesitated. "Wolf would find it difficult. The police always have an eye on him. I suppose a go-between could pose as a roustabout and strike up a conversation in a Waystation One bar. But what then? Criminals don't really entrust big deals to friends of friends, do they?"

"Not often," agreed Vardos, reflecting that the Chief had hit upon the *modus operandi*. Wolf could discuss preliminaries on Vesta with go-betweens—but for the *res*, for the *vital* business (whatever it was) he sent his programmed half-brother-by-marriage.

The Vestan Pleasure Dome curved over a sparkling palace of white icing and faceted crystals. The main hall was the theater, but around it were the glitter-and-gold casino salons. The restaurants were in the first sublevel, constructed to resemble the confectionery delicacy of the upper palace.

Vardos went to the second sublevel—the freight platform to which his company's property trunks would arrive via the cargo tunnels. The container trundled along in due course. The freight handlers opened it and transferred the trunks to the lift serving the backstage area. Vardos rode up into the theater with the trunks, and talked to the stage manager about his accomodations, since another troupe was currently playing the palace. There was, fortunately, a spare cubicle in Thespian quarters, and the stage manager had already directed Vardos's personal luggage to be taken there.

The cubicle's outer wall was a curve, being directly against the dome. There was a minimum of space, but

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gilt and glitter achieved a *bijou* sprightliness. Vardos changed from his travel jumpsuit to more appropriate attire—deep purple doublet-and-hose, checked with gold, and purple buskins with gold laces.

Confident of not being upstaged by the scenery, Vardos strolled from the theater and made the rounds of the elegant casinos—not to gamble, but to experience words and gestures.

As he paused to watch the spin of a roulette wheel, a footman-costumed employee came up to him and whispered, "A DM call, Bard Laureate," and handed the Bard a mini/audio disk.

The Bard withdrew to a fountained alcove, held the disk close to his cheek, pressed the ON wafer and said, "Vardos Vayan—yes?"

A feminine voice, low and pleasant, responded, "Bard Laureate, this is Meta Eglantine. The Chief Agronom said you were interested in the Tomas collar. I've DM'd the Eglantine farm. Nick's father is making a produce delivery to a mining wheel, but his mother would be honored to receive you this afternoon."

"Thank you, Dame Meta. You'll come too, of course?"

A pause, then a hurried, "I have no minder for the boys, when they come home from school. You understand, Bard, small children are never left unsupervised in the domes, in case of a meteor hit or—or other system failure."

"Bring the boys along," smiled the Bard. "Surely they'd enjoy a visit to Grandpapa's farm!"

"No!" she said, so violently that the disk hummed. She added, "That is, they'll be—better off—on Vesta."

"Could you be my guest at lunch?"

"I—I suppose I must," she agreed, with a dreary resignation that made the Bard smile. He had not thought he was so hard to take. She seemed to pull herself together. "I mean, thank you. Where?"

"Can you recommend a restaurant where we could talk undisturbed?"

"The Health Table, first sublevel under the clinic, in the University Dome," she said immediately. "Nobody ventures there except absent-minded rabbits."

The Bard laughed, pleased at this touch of humor. The lunch had begun to sound rather soggy. "At the noon carillon, Dame Meta?"

"Yes, that will be—safe enough—"

The Bard was thoughtful as he returned the mini/audio disk to the footman.

Vesta's sublevel arcades were clean and airy, in contrast to the Moon's grubby tunnels. The atmosphere was of a village market, as if a woodland vista were just around the corner.

The Health Table was not open-front, as were most of the shops, but hid its wares behind a facade with large shingles and tiny-paned windows—for the excellent reason, thought the Bard, that no Vestan would want his friends to see him eating in such a crackpot place.

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The Bard entered the narrow doorway and found himself in a white-tiled, surgically-clean little cafeteria with a scattering of tables and chairs. Several of these were occupied by bearded gentlemen munching greenery. At a corner table sat a young woman with smooth dark hair and a pale, cameo-distinct face. She wore a black fringed shawl crossed over her white bodice, a black divided skirt, black stockings and shoes. a black pouch-bag lay on the other chair at the table.

Her somber glance brightened as she looked up and saw the Bard. She removed the pouch-bag and hung it over the back corner of her chair. "Do sit down, Bard Laureate—or would you rather take the shock of the day's menu at once?"

"Oh, I've eaten my share of space pemmican," grinned Vardos. "Let's fetch our nourishment, shall we?"

She rose and led him to the menu counter, where the numbered dishes were displayed. "It's all raw, you see. Grated carrots, sliced spinach, with and without."

"With and without what?"

"Onion. But they're sneaky about slicing the garlic in, so one must be careful. And here's your old friend, space pemmican—"

"I'll take it," said the Bard hastily.

She smiled and tapped the order buttons. The Bard slid his credit card into the scanner, which registered and returned it. A tray of selected food emerged onto the counter rack.

Vardos carried the tray to their table, and they sat down and dined—if one can dine on raw roughage and beet juice.

When the last crumb of pemmican had disappeared, Meta said calmly, "You want to talk about Nick, of course. Sometimes I want to talk to anyone who could avenge his death. And sometimes I'm just—tired."

"The Chief Agronom said you could tell me about the Widow Tomas."

"Yes. Twelve years ago I graduated from Agriculture College on Earth. My field was space farming, and I was sent to Vesta. I enjoyed the work immensely, helping the farmers keep one step ahead of the odd mutations and soil changes that seem to develop despite shielding against cosmic rays.

"The Tomas collar was a hopeless mess. Tom had run away to Earth, and his half-brother Wolf simply would not farm. He said he was above working with his hands, and I believe he was really very clever—not in *doing*, but in *comprehending*.

"It's a mental attitude very hard to explain," she went on. "Nick said that Wolf wouldn't exert himself to cross a room and turn off a DM console—but he could have built one with his eyes shut.

"Well, the Board experts took turns going out to the collar to help Dame Tomas, and after the forfeit order was issued, the turn came around to *me*. I had no objection to going out to the axle. I had already met Nick on Vesta and felt as if I knew his parents."

She paused, then said ruefully, "It was frightful—the Tomas collar, I

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mean. A ramrod of a woman, as sharp as acid—and that hulking Wolf. The collar was all bits and pieces, as if a mechanically-minded baby had taken everything apart. There was no agricultural reason for me to stay, but with the property in forfeit, I represented the Board and felt I had a legal responsibility.

"I spent a couple days inventorying the pieces—and then Tom Tomas arrived home. I like him—I could see he was far different from Wolf. But I had no more than met him than the old woman hustled him into their private quarters. I was living in the shed which most collars have for nonfamily workers.

"With Tom home, I felt I could take an evening off and visit the Eglantines. I went toward the Tomas residence to tell the old woman I would be off the collar for a couple hours—but a peculiar thing happened."

She paused again. "Do you know anything about the construction of a farm collar?"

"I know it's attached to the axle by two opposing radius rods that are also access tunnels into the axle, where the power systems are. A collar is usually divided into temperature/humidity sections, and each section has upper and lower dirt-banks."

"You *do* know about the upper dirt bank. That makes it easier to explain. For aesthetic reasons the banks stop short of the residence, giving a small lawn or terrace, and the residence has windows. On the Tomas collar, of course, the cleared spaces on either side of the residence held the taken-apart junk.

"A large shiny steel panel was propped up to block the end of one upper dirt bank. I think Wolf had thrust it up there simply to get rid of it. On the ground, angled against a harrow shaft, was a matching steel panel. As I approached this lower panel, I realized I was looking into an upper room.

"It was so eerie that I stopped. In the panel, as clear as a DM picture, I could see Tom sitting in a chair—blank-faced, as if he were dead. I thought he *was* dead, until I saw that the other two were talking to him. Dame Tomas was making the same swinging gesture over and over.

"It seemed magic—until I looked around and saw the polished steel panel across the upper bank. A mirror in the room had thrown the picture out of the window to the upper panel, which had in turn angled it below.

"There was so much *evil* in that dead-staring figure—and the other two, crouched like vultures. I—I panicked and ran. I climbed the ladder to the first radial tunnel, opened the hatch—and moved as if in a nightmare, because, of course, I was pulling myself up into no-gravity at the axle.

"I entered the axle, fumbled along the handholds to an Eglantine radius and foolishly dove headfirst into the tunnel. As I felt the centrifugal force dragging me faster and faster, I managed to clutch the handrails and brake my fall. But I landed on the Eglantine

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hatch shoulderfirst and had trouble opening the hatch and climbing down the ladder to the ground.

"The opening hatch had sounded an alarm, and Eglantine came running to meet me. I was in hysterics. Meanwhile, of course, an alarm had sounded in the Tomas collar when I had left, and Dame Tomas was DMing the neighbors to find out where I was.

"Dame Eglantine kept her head and told Dame Tomas I was visiting them as a friend of Nick's. The Eglantines were very kind—but I was too hysterical to explain why I had panicked. I just begged them to get me to Vesta, and they called a space cab—and paid for it, too, since my credit card was with my suitcase in the Tomas's shed.

"When I reported to the Agriculture Board the next morning, I thought the Chief might be angry. But he only said the widow was a witch.

"Later that day, Tom Tomas came to the Board with my suitcase. He said he was sorry I had been taken so very ill, and I could see he *believed* it. I nearly panicked again—I didn't know *what* that pair had done to him."

Vardos interposed, "The Chief Agronom said the puzzle nagged at your husband."

"Yes. Nick had grown up with Tom, and Tom visited us often, after we were married. Tom could talk very entertainingly about his Thespian experiences, but he obviously was making no other human contacts. He never seemed to remember his travel routes—or how many months had gone by. He never changed. He was like a man isolated inside a soap bubble.

"Nick was intrigued by the *puzzle*, but I sensed the *danger*. Even more than Nick, I sensed Tom's abnormality." She smiled, shy color coming into her face. "I won't say that marriage *bored* me—I was always glad I married Nick—but space-motherhood was tedious, after my career.

"Not that I ever once considered putting the babies in the public nursery," she added. "The lessons of the Glacial Melt are still burned into our minds—perhaps even into our genes. When the earthquakes struck—and the tidal waves and storms washed over the cities—the children who survived came from family units, where parents could protect and improvise and sacrifice their own lives. Institutionalized children died by the thousands because there was no individual help. How many toddlers were rescued from hasty rafts, where they had clung against unbelievable odds because a parent had *told* them to hang on—!

"No, in these artificial domes, I was not going to turn my boys over to public care—but life was rather dull, all the same, and Tom's visits and stories were very welcome. But my ego nosedived at first, when I saw that I was only a shadow to Tom. I wanted to feel still young and attractive—and Tom never *noticed* me! Gradually I realized Tom's disinterest was not due to my dowdiness but to his peculiar isolation."

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She laughed, blushing once more. "What must you think of me, Bard! Yearning for admiration from my husband's best friend—! Oh, it was harmless conceit on my part," she added before he could speak, "but it emphasized the extent to which Tom had been—what? Bewitched? We were convinced Wolf Woldan somehow had caused the deaths on the axle. There was *danger* in prying into what they had done with Tom.

"So I begged Nick not to meddle. While Tom was on Earth, Nick would half-forget. But every time Tom returned to Vesta, the mystery would flare up again. In this manner the years went by—and when Nick died in space, I knew the vile pair had killed him."

"Do you know *why* the murder was finally necessary?"

"No. But, you see, Bard, they may believe Nick confided in me. That's why I don't take the children to the farm. If there are more 'systems failures,' I don't want the boys to be involved."

"Naturally," agreed the Bard. "I would not like to involve *you* in danger, either—although your presence on the collar would make me feel less impertinent."

There was a mutually thoughtful silence. Then Meta said, "Bard, I've been thinking—having gone this far, I may as well go to the collar with you. Nick wasn't killed on the collar, but in space. Even Wolf can see the folly of yet another death on the axle."

"We must hazard space to reach the axle. If Wolf has a Vestan accomplice who is keeping you under surveillance—"

"He may have probed into my conversation with the Chief Agronom—but there's no way a random space cab could be disrupted like Nick's van!"

"Can you order randomly?" he asked.

She lifted the pouch-bag off the corner of the chair and took out a mini/audio disk. "*You* may order, Bard. The Eglantine collar is coded Victor 23. A central computer in the Transportation Dome distributes orders in sequence to the cabs. There's no way anyone can *predict* which cab we'll be assigned."

She pressed the buttons and handed the disk to the Bard. He heard a robot voice say, "Space cabs."

Vardos replied, "Ordering a cab to farm collar coded Victor 23, in half an hour."

"One moment . . . Your cab will lift out of slot six. Please be prompt. Your name and credit number?"

Vardos read off the information. As he returned the disk, he smiled, "How shall we spend the next half hour?"

"Hurry to the Transportation Dome and *eat*!" laughed Meta.

The cab slots were sublevel, with tracks that slanted upwards, under the dome wall, and surfaced over the silica slag heaps. A bulletlike vehicle was waiting in slot six, the driver reading a news transcript.

When Meta and the Bard stepped onto the slot platform, the driver acti-

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vated the cab's hatch, his face showing amazement. "Meta! So you're taking the Bard to the collar! I wondered—"

"Hello, Frank," smiled Meta. "Yes, the Chief Agronom handed me the Visiting Fireman routine."

She entered the cab, which had a narrow aisle aft of the cockpit, with three seats on either side. Meta chose a forward seat. The Bard slipped into the seat across from her.

The driver folded the transcript. "Bard Laureate, you cut it kinda fine. Another sixty seconds and I'd of had to reschedule."

"I hate to rush my meals," said the Bard.

"Tell that to a computer. Lock in, you two. Ready for systems check."

Frank pulled the mike rod from the control pane' and began speaking into it. Their programmed course made a ripple of green lights over the console. A large panel said COUNTDOWN, and the numbers clicked, . . . 4 . . . 3 . . . 2 . . .

ABORT . . . ABORT . . . The sign flashed frantically red. The entire panel was red.

But the cab jerked and shot forward, accelerating up the track and arrowing wildly into the teeth of the space traffic.

Frank fought for manual control but could not get it. On all sides of them, vehicles responding to automatic evasion yawed and tumbled to avoid the runaway cab.

The Bard heard Meta gasp, "System failure—!" Her face was like alabaster.

But the cab had been entirely random—and the navigation system could *not* be distorted by a simple beam. How—?

In a flash the Bard understood. In this instance it was the *person* and not the *vehicle*, who carried the disruptive device. He remembered Meta hanging her pouch-bag on her chair—and casually leaving it there when they went to the cafeteria counter. She probably had casually left it other places.

He heard her breathe, "Oh, God!" and saw a wheel rushing toward them. Vesta's atomic power station.

He grabbed the pouch-bag from Meta's nerveless fingers and dumped the contents in the aisle. A notebook spewed a thin metal rectangle from its pages.

Meta shuddered—and he knew she had never seen the rectangle before but had guessed its purpose. He snatched it up and smashed it against his seat-arm.

Some of the red lights changed to green. "Got it!" yelled Frank, his hands seeming to play a tune on the jet levers.

The wheel was upon them—and Frank side-swerved between two spokes, like (thought the Bard) a hummingbird darting through a spinning wagon wheel.

The cab was clear—in empty space—and Traffic Control was going crazy over the communicator. "Frank! You pulled that one out! Gave us heartfailure! What the *hell*—?"

"Some murdering bastard disrupted my cab, that's what!" bellowed

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Frank. "Gimme a course, will ya?"

"Yeah, we'll compute you back to Vesta. Sit tight."

The Bard released his seat clamps, leaned over Frank's shoulder and said into the mike, "Dhaulagiri Security requesting override. Please compute to Victor 23."

There was a silence. The Bard settled back. Frank wiped his face and looked around. His eye fell on the dumped bag and splintered disruptor. He commented, "You think quick, Bard."

"I'm either quick—or dead, Frank."

Vestan control spoke, in a different, more authoritative voice. "The Bard Laureate's Dhaulagiri override is allowed. Computing for Victor 23."

Meta stirred. "Bard, they put the disruptor into my bag—but which of us did they want to kill?"

"Two birds with one stone, I imagine," smiled the Bard. He added. "In view of what's happened, Dame Meta, I think you should return to Vesta with Frank. I'm likely to be delayed on the collar, and your boys will be expecting you home."

"Yeah, you come with me, Meta," said Frank. He confided to the Bard, "Don't worry—I'll see she's given a police watch, from now on."

The new ripple of green lights spread across the panel, and the space cab reeled into course.

Dame Eglantine was waiting at the airlock threshold when the Bard stepped into the collar. Meta's mother-in-law was a trim, gray-haired woman with a pleasing figure and youthful light in her eyes. A flowered bib-apron was tied around her gardening coverall. She smiled and held out her hand, "Welcome, Bard Laureate."

He took the hand and bowed. "Thank you for so kindly receiving me, Dame Eglantine."

"Do come to the residence! But isn't Meta with you?"

The Bard put his finger to his lips and shook his head. Then he replied, "She couldn't spare the time."

As Meta had said, Dame Eglantine was a quick-witted woman. She returned calmly, "Such a pity! We're so fond of her!"

The Bard nodded approval and made a winding up gesture with his hand. Dame Eglantine took a deep breath and gushed brightly, "Have you been on a farm collar before?" They moved along the green sod path between double banks of small plants, and she prattled, "This is our seedling section—we deal both in seedlings and vegetables. Many of the mining wheels want to grow their own food but can't be bothered with seeds."

The Bard thanked his good fortune that Dame Eglantine was so coolly alert. When he had heard Meta's story about the murders, he had immediately understood that Wolf Woldan had been *listening to* the other collars. The neighbor who had been killed twenty years earlier by the tank explosion—and Nick Eglantine who had died in space—had never voiced *public* suspi-

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cion about Owner Tomas's murder. How had Wolf known they had to be silenced? Because, reasoned the Bard, he had listened to their *private* conversations on the axle.

It was natural, reasoned the Bard further, that Nick had not confided his deductions to Meta. She had been afraid and had begged him not to meddle. And it was equally natural that Nick, wanting to hear how his ideas sounded aloud, had come to the collar and spoken to his parents.

But what had he *said?* How could the Bard question Dame Eglantine without endangering her life? Wolf's audio monitor probably had a background filter, so that music or noise would be no screen at all.

They were now walking through the next section—warmer, more humid—in which the fan leaves of melon vines made a jungle of the dirt banks. Dame Eglantine, having reached narrative cruising speed, chatted easily about the care, feeding, superiority, and profits of the Eglantine melon. The Bard interposed a "Very interesting," when required, while he searched his brains for means to communicate *quickly.*

Beyond the melon jungle was the hardware shed, where machines and tools were neatly stowed. A large locker labelled *Emergency/Repair* caught the Bard's eye. Motioning Dame Eglantine to continue on the subject of nitrogen percentages, he opened the locker. At the bottom were stacked the tent/systems which a person could zip around himself in three seconds—if the emergency allowed him that much time to react.

Carefully racked above the tent/systems was an assortment of space/repair suits, the special, extremely flexible type developed in the Asteroids, where collar surfaces were afflicted by constant granular peppering and slag/dust build-up. A farmer doing repair work alone—or combining it with collar supervision—was popping in and out of both atmosphere and gravity to the extent that a suit had to apply to all conditions. The Asteroid suit had internal radio communication and external atmosphere pick-up and transmission, along with a handy harness/webbing for farm/space tools.

The Bard estimated that the tallest suit would fit himself. He pointed to the suits, swung his hand to beat gently in the cadence of Dame Eglantine's volubility—then suddenly drew his finger across his throat.

She stopped in midsyllable and waited. As quietly as he could he took down the suit he wanted, and indicated she should do the same. Swiftly she discarded the bulky flowered apron and chose a smaller suit.

They suited up in silence and locked their helmets into place. Vardos switched off the atmosphere pick-up on each suit and spoke via the radio.

"You're marvelous!" he said to Dame Eglantine.

"Bewildered is the word," she replied. "So you think the collar is monitored! Won't the listeners now tune into the suit frequencies?"

"Wolf Woldan is an expert in sys-

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tems failures. Our abrupt cut off will, I hope, keep him busy trying to find the fault in his own device."

"Wolf Woldan! But then, he's been listening for—for years! Even when Meta fled to us, that night—!"

"Yes—and fortunately Meta was too hysterical to explain *what* she had seen. Wolf and his mother had been hypnotizing Tom Tomas in an upstairs room and felt safe about *that*. They had been deliberately playing on Meta's nerves, and they assumed she had suddenly broken down.

"Now, Dame Eglantine, what did Wolf hear a year ago that caused him to kill your son?"

"It might have been a conversation with his father," she said uncertainly. "The two of them were always talking about Nick's work."

His *work*! The Bard cursed his inattention to what Meta had told him. "Your son was an electrical inspector?"

"Well, the job was *called* that, but Nick's field was electronic systems. In space, with so many sophisticated systems, it's terribly important that one system doesn't jam another. On rural Earth, a power saw can jam a DM console without causing more than irksome inconvenience. But if a starship engine disrupts a wheel's life-support systems, people *die*.

"Nick's job was to make sure that any new piece of hardware could neither cause, nor suffer from, disruption. And everyone *is* shielded, Bard! I remember Nick saying how astronomical the chances were against one anti-jamming field cancelling another. He said it was like finding a random key to a door lock—or a random line of numbers to a safe combination—"

The tumblers fell into place in the Bard's mind. He asked, "*When* did he say that?"

"Why, I recall it so well because it was the last—"

She stopped.

The Bard said. "It's time I paid the clever Master Wolf a call—but I must bring you to a safe place. Could you wait at the axle center for me?"

"Wolf will hear the alarm when we open the tunnel hatch!"

The Bard surveyed the hand-tools. Noiselessly he took a laserbeam cutter, a knife/screwdriver, a jet-pistol, and a flashlamp. He stowed them in his harness pockets and beckoned Dame Eglantine to follow him back through the sections.

Their flexible boots made no sound on the sodded path. They came to the radius hatch, in the "roof" of the area which contained the airlock. The Bard swung lithely up the ladder, opened the box of the alarm mechanism, and removed the fuse. Then he opened the hatch and propelled himself "up" the tunnel into no-gravity. When he had arrived at the more spacious tunnel of the axle, he looked back and saw that Dame Eglantine was following him with true spacewoman dexterity.

He paused so that they could float side by side. He cautioned, "Stay in the axle. I don't want *anybody's* hatch alarms sounding on Wolf's monitor. You have a full air pack?"

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"Of course. But surely Wolf hasn't prepared any air blow-outs within the axle! I could dehelmet and breathe axle air!"

"Please—don't take the chance!"

She gestured agreement. He turned "outward" to the crossing of the Tomas access rods, chose a radius and dropped bootfirst into the tunnel, braking his descent in the increasing gravity. He stopped himself above the entrance hatch by wedging a boot and a glove into the holds on one side of the tunnel.

He paused to orient himself. Probably all the alarm boxes had been installed at the same spot, relative to the hatch mechanism. The tunnel was only dimly lit. He drew the flashlamp from his harness and directed the intense light upon the positioning of the hatch hardware.

He replaced the flashlamp, drew the laser cutter, waited until his eyes had adjusted to the dimmer tunnel, and lasered a half-circle near a corner of the metal hatch-plate. Bracing his steel-strong muscles—boots on one side of the tunnel and gloved hands on the other—he lowered himself until he could bend the lasered plate-edge, force an arm through the opening, grope the cover off the alarm box and fumble out the fuse.

Gasping involuntarily at the sudden release of strain, he opened the hatch and slid down the ladder to the ground. He switched off his suit-radio, activated the atmosphere pick-up, and looked around.

Rows of overgrown, split-open cabbages straggled along the weed-choked dirt banks. The Bard reflected that one way a person could wreck cabbage was by not harvesting it. After the Gala, Tom Tomas would return to the collar and make the best deal he could with the food processors for cabbages that might have fetched a high price a month earlier.

Vardos heard nothing on his suit pick-up. He had not expected Wolf and the widow to be on the neglected farm. The audio/monitor would be within the residence. He continued warily. The machinery shed was a shambles of rusty, taken-apart equipment, the overflow of junk flooding the terrace of the storey-and-a-half residence.

The atmosphere pick-up began to give forth signs of life. The door of the residence—opening outward like all residence doors—was ajar. Vardos reflected that Wolf Woldan, with his 'mechanically-minded-baby' brain, probably never closed a door after him.

Crouching below windowsill level, Vardos made a dash for the house and flattened himself behind the door. He turned up the volume on his suit pick-up.

He heard a mixture of several audio probes being monitored simultaneously. Wolf apparently could stake the axle out, section by section—and *comprehend* them simultaneously. From the jumble Vardos could distinguish a puberty-cracked voice, ". . . you promised you'd go to the Gala with me . . .", and a woman's ". . .

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never again buy lamb from that sector four axle . . .", and a man's ". . . a hundred kilos of fancy tomatoes to be delivered . . ."

One by one the voices were tuned out, until there remained a band of slightly rasping silence. This band, too, was switched off, and a heavy male voice said, "It's that damned Thespian with some new Dhaulagiri gadget. Blocked me out completely. Wonder what he's saying to the Eglantine woman."

A sharp female tone answered, "Wolf, you should have rigged another fire blow-out, when Nick was here."

"Two fire blow-outs on the same axle? No, Ma. *One* failure is bad luck. *Two* identical failures make statistics, correlations."

"Well, what are you going to do?"

Another silence. Wolf said. "They're still on the collar. I ain't heard no exit alarms."

"What could have happened in the space cab? I *said* Gregorius was a bungler."

"The cab distorted—you heard Traffic Control. Gregorius planted the decoder on Meta and activated it during countdown."

"Yes—and the next thing we heard was Frank regaining manual, and an all-too-familiar DM-voice requesting a Dhaulagiri override. The interfering wretch must have found the decoder!"

"Of course he found it—he was looking for it."

"But *how—why?* Did Tom—?"

"No. Tom don't know more'n that doorpost."

"The Dhaulagiri computers?"

"The computers don't have nothing to compute, Ma. In ten years we ain't disrupted the same system twice."

"Something else must have brought the Security hawk upon us—something that didn't fit together—*psychically.*"

"He's only a Thespian, Ma—no more psychic than Tom."

"Tom is a mimic—a masquerader. Vardos Vayan is a Bard—with the noticing eye of the eagle. We can't let him leave the axle alive."

"But, Ma—maybe he's working with other agents—"

"No. He made no special trip to Vesta. He was coming here anyway. He went to the Agriculture Board, not to the police. He has no business investigating ordinary crime—he's attached to Security. He's here because something didn't fit together."

"When he found the cab decoder, they fit together fast."

"All the more reason to be rid of him."

There was a silence. Vardos remained a space-suited statue behind the door.

The woman's sharp voice spoke again. "You've finished the airlock decoder, haven't you?"

"But we can't use *that,* Ma! The routine is all set for Tom's next trip to Earth! It'll be our best haul yet! A patrol ship headed out to Callisto Chemicals with atomic fuel—the airlock blows out—and a space tug just

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happens to be nearby, to put a crew aboard and claim salvage on the ship and cargo! Salvage on the Callisto fuel supply—!"

"You can make another decoder, if you can't get this one back. Wolf, you're too squeamish about statistics. Airlock blow-outs are a common space hazard. Nobody will connect an airlock misfunction on the Eglantine collar with a patrol ship accident. Where's the correlation?"

A pause. "None, I guess."

"You don't even have to go into the Eglantine collar to plant the decoder. Go out our airlock—"

Vardos had tensed his muscles for a dash back to the radius-hatch, but it seemed to him the sharp voice was approaching, so he stayed behind the door.

A heavy figure and a lighter one brushed past his hiding place. The voices diminished toward the chaos in the machinery shed. Vardos took a chance, stepped from behind the door and slipped into the house.

He stopped short in amazement. Aside from Wolf's listening apparatus, the parlor was an elegantly furnished room. Rare porcelain—gold goblets—jeweled *objets d'art*. His astonished eyes recognized a ceremonial chalice that had disappeared with other valuables from the Earth Council's Audience Chamber during a renovation. The Chamber door had not locked properly when the night-switch had been thrown. Subsequently, nothing had been found wrong with the door mechanism. The conclusion was that plaster dust had blocked the sensitive circuits, and stray thieves had by chance—

In ten years we ain't disrupted the same system twice.

The Bard concealed himself behind a ruffled curtain and glanced out the window. He saw a tall, straight-backed woman in a long-skirted black dress. She had sleekly-knotted iron-gray hair, a hatchet-thin face, and piercing black eyes that made him draw back a moment until he realized she could not possibly see him.

She was watching a fat-slowed man with powerful shoulders, as he rummaged through a box of odds and ends. Wolf was, thought the Bard, an idiot/genius—seeing with his fingers as well as with his eyes. His comprehension was totally mechanical. Of humanity he owned not an atom—and his mother was a cold dagger of greed.

Vardos did not know how long it would take Wolf to adjust the decoder for the Eglantine airlock. He found the opposite door of the residence, exited and jogged around the collar to reach the defused hatch.

He sprang up the tunnel and emerged into the axle. Dame Eglantine was floating patiently where he had left her. He switched to radio communication and said, "The hatch alarms are mere doorbells at usually unlocked divisions of inner space. They are a convenience, not a necessity. I assume, however, an airlock alarm could not be tampered with."

"Not unless you want to alert In-

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spection on Vesta," Dame Eglantine replied.

The Bard thought desperately. How could he get into space without an alarm sounding on Wolf's monitor? *Inspection*—! He said quickly, "There's an Inspection airlock on the axle, isn't there? Inspectors don't trudge through the collars to reach the power systems."

"Yes, the Inspection airlock is within the central nodule—but it can be keyed open only by a patrol van."

"Normal use rings no alarms on the collars?"

"Why should it? We can't enter the nodule, no matter what happens. If a back-up system is brought into use, the alarm rings on Vesta, and the Inspectors come immediately."

The Bard was already swinging from handhold to handhold, toward the central nodule. Here the axle swelled to a mini-Rotunda. The sealed power unit was in the middle, and the tunnel split and continued on either side.

A six-letter combination lock sealed the nodule hatch. Vardos flashed his lamp on the AAAAAA. Dame Eglantine asked, "Do Security agents have the axle codes?"

"No—but they have experience with Inspectors and human nature," said Vardos, with a smile that was audible through the radio communication. "Each inspection department sets the combinations for the axles it services. Random letters would necessitate a *list* kept somewhere or somehow in the patrol van—a list subject to

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being lost or stolen. Hence, each axle is given a *word* that patrolmen can remember by mental association. Axles have personalities and nicknames, just like Waystations."

"Oh, but then the code word would be too easy!" laughed Dame Eglantine. "The sheep-grazing axle would be MEADOW—and we would be VICTOR!"

"No, the codes aren't all that obvious," agreed Vardos. "The sheep axle might be BAABAA or CUTLET—but the *association* would be there so that the van pilot could tap out the correct code without delay at the airlock. Now, what is the mental association for this axle?"

"Heavens—I can't even make a guess!"

"I can," said Vardos. He rotated the combination to spell MURDER.

Dame Eglantine gave a stifled exclamation. The hatch did not open.

Vardos thought again. What had impressed *him*—? A flint-thin face and uncanny black eyes. Slowly he brought the first letter around W. It seemed to fall into place by itself. The second letter—and the same fluidity when the H fell into I. The merest touch brought the third wheel from S into T. The Bard reflected that Inspectors had opened these locks—either manually or electronically—many times, and robot devices acquire habits.

When he had WITCH he still lacked a letter. It would be easy enough to run through the alphabet, but on a hunch he tried T.

The hatch clicked open. Dame Eglantine said, "Heavens!" again. The Bard warned, "Stay in the axle!" entered the nodule and went directly to the airlock. WITCHT activated it. He stepped through it and into space.

Exhilarated, as always, by the soft purple-blackness, he looked around and reflected that the Vesta neighborhoods were getting crowded. All around him were light-rimmed collars, moving like cosmic carousels. Vesta itself blazed like a mirror, the domes as bright as the silica surface.

He called himself back from his Bard-dreaming. A shadow had smudged the lights rimming the Tomas collar. Vardos, on stepping into space, had let himself drift outwards from the axle until he was beyond radius distance and could look "down" on the Eglantine collar directly "below," and the Tomas collar at the end of the axle. He could see the cometlike sparking of Wolf's jet pistol—but the scene was rotating away from him. Another rotation period—and the shadow was blotting the Eglantine lights. Wolf was pulling himself along the collar to the green-rimmed airlock.

The Bard checked his drift with a short blast from his pistol, and waited. From what he had overheard between Wolf and Dame Tomas, he deduced that the disruption was a two-part process—the planting of the decoder, and the release of an activating beam. When would Wolf release the beam?

Two more rotations—and the shadow was sparking back to the Tomas

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collar. Wolf apparently meant to activate the beam from inside the collar. Would there be time—?

The Bard decided to take the chance. He timed the onrush of the Eglantine collar, fired a long blast, and—more space-dexterous than Wolf Woldan—arrived squarely upon the curved outer bay of the airlock.

His glance at once caught the shine of the decoding rectangle, magnet-affixed to the bay. He tore it off, magnet and all, and turned the jet over to the Tomas collar. Because the collars rotated in unison, the airlocks were abeam. He could see the Tomas lock shift to amber as it opened to admit Wolf. A few seconds later, the green reappeared.

The Bard knew he now had only as long as it would take Wolf to walk from the airlock to the residence and activate the beam.

Timing the space-lag of the maneuver, Vardos again blasted off and hit the Tomas airlock dead center—or would have hit it if he had not jet-braked at the last second. Poised noiselessly outside the bay, he pressed the magnet/rectangle to the surface—then blasted away in almost the same motion, receding backwards into emptiness.

The airlock seemed to blow up in his face. The bay swung outwards—ripped off—and spun away in horrible slow motion. A great, silent whoosh of air swept a flood of objects towards the receding Vardos. He found himself being overtaken by space-frozen cabbages, and he blasted away from the plane of the flood.

He remembered he had left Dame Eglantine in the axle, and he maneuvered back to the Inspection airlock, entered, emerged from the systems nodule and looked for her. She was around the curve of the tunnel watching a panel on which there were four lines of lights.

Three of the lines were green. The fourth was like a trail of blood drops.

When she saw the Bard, she exclaimed in a horrified voice, "The Tomas collar—blow-out red in all sections! What—what happened?"

"In the terms of historical warfare, I intercepted a live grenade and lobbed it back at the throwers."

"Oh." She paused. "As a Security agent, you—don't mind killing."

"I mind it very much," said Vardos. "That's why I arrange for my victims to spare me the trouble."

He noted a red light flashing elsewhere on the panel. The air was bleeding out of the axle and tunnels. He realized that the lasered gash in the Tomas hatch was letting air escape. He dove along the axle, sprang down the Tomas tunnel, and hoped a space-frozen cabbage would be left to plug the gap in the hatch. He did not much like the idea of contributing a leg or arm to emergency repair.

The collar neighbors, hastily space-suited to answer the red alarm, joined Vardos in the gruesome hunt for the bodies of Dame Tomas and her son, in the exploded collar. The residence had blown apart. Two burst, frozen bodies

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lay mangled amid the scrap metal of the terrace. During this moment of general horror—the mind-numb attempt to lift the scrap from what once had been human, Vardos quietly withdrew to the shed and looked for decoder strips. They seemed to be thin metal plates enclosing minute circuitry. Once seen, they were oddly memorable.

All at once he understood why the collar neighbor had been killed twenty years earlier, after the Tomas murder.

Dame Eglantine had returned to her farm. Vardos entered via the hatch, set the alarm box to rights, climbed down the ladder and strolled to the Emergency/Repair locker. Dame Eglantine came as he was doffing the borrowed spacesuit. She asked, "Will you stay for supper, Bard?"

"Thank you, no—but I hope you and Owner Eglantine will be my guests at the Gala."

"How kind of you! Yes, a look backstage would be fun," she smiled. "Nick would have liked—"

Her face clouded over. "Bard, whatever was done, I trust it was not done in revenge. I trust it was somehow—objectively necessary."

He folded the suit and set it aside, so that Eglantine could recharge the airpack and recheck safety. "Of course the deaths of that pair were objectively necessary! And I hope the advanced skeleton key techniques died with Wolf's twisted brain! May mankind continue to use the gift of simultaneous comprehension harmlessly in chess contests! My own feeling at this moment is pity for Wolf's victims—and for the living more than the dead. Can Tom Tomas be deprogrammed without deep psychic wounds?"

"I pray it can be done," sighed Dame Eglantine. "Tom was always a fine lad."

At the end of the week, the Bard Laureate's troupe arrived on Vesta. Bad news was not allowed aboard the Vestan pleasure cruisers, so Tom Tomas was deftly singled out from the passengers arriving at Tourist Reception. George Apfelstein, scenting trouble, accompanied him to the pleasantly pastel lounge where Vardos was waiting. The Tourist guide left them, and Vardos stepped forward. He began, "Tom, you'll have guessed we have bad news for you."

"Bad news has dogged my life, Bard," said Tom quietly. "Was it—Meta—this time—?"

"No. Meta is safe. The accident happened on your collar."

Tom stared incredulously. "Not to Mother or Wolf! They're so clever! They're not the sort of people who have accidents."

"I'm sorry, Tom. The airlock blew out. They had no chance."

Tom seemed dizzy. Vardos took his arm. "Sit down, Tom. Tell us how we can help you."

Tom perched on the edge of a chair. The Bard and Apfelstein sat on a nearby bench. Tom said, "It's not a question of help. It's that I'm not used to

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being alone. I can't think what to do first."

"What do you usually do first, when you come home?"

"Mother takes care of everything. I just bring the trunk to the farm and start working on the crop. The year ends when I come home. I can't think how to continue."

"Dame Tomas told you where to travel on Earth?"

"I go so many places. It's hard to remember."

"But you remember we're playing the palace?"

"Oh, yes! My Thespian work is clear. I can remember every Rotunda and Amphitheater I've ever played. My mind is just—blank—about the rest."

"You've received a shock," said the Bard soothingly. "Let George take you to Thespian quarters, and forget the collar for now."

Tom nodded. "I wasn't to go home until after the Gala, anyhow."

Vardos and Apfelstein exchanged a glance, and Apfelstein coaxed Tom away.

Half an hour later Vardos and a Vestan police captain stood over Tom's opened trunk, on the sub-level freight platform.

"Nobody would look in Tom Tomas's trunk for criminal evidence!" said the captain. "I still can't believe—!"

Vardos tapped the thick lining of the truck lid. "A secret panel, of course."

He found the "blind" release button and pressed it. The lid panel opened. In the concealed space was a deposit slip for several thousand credits in an Earth bank. Vardos explained, "This year's coup must have been a business swindle—like the salvage claim Wolf had planned for next season, when his airlock disruptor was to have killed the crew of a patrol ship carrying fuel to Callisto.

"The type of strike varied," he went on, "but the procedure was for Wolf to put the required disruptors into the trunk lid. Under hypnosis by Dame Tomas, Tom would travel where the Earth organization could intercept the trunk, remove the disruptors, and insert the agreed upon payment. There was also a sharing of the loot Dame Tomas craved. Once, Tom came home with the Earth Council's chalice, which he must have carried in another container—so brainwashed he didn't even see it."

"Incredible! And what the No Fault courts will make of it, I don't know!" declared the captain. "I guess Tom can prove himself brainwashed, right enough. The polygraphs will show the truth. But if the poor fellow is innocent, what am I to do with him? Hold him in a Mental Unit until the Gala is over and the psychologists are back to work? That's not really fair, is it?"

"Would you let me have custody of Tom?" asked Vardos.

The captain smiled, "Thinking of your opening at the palace tonight, eh? You need Tom pretty badly, don't you?"

"Oh, the show always goes on, regardless," smiled the Bard, "but an

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understudy will be nowhere as good as Tom—and the disappointed audience may let its wrath fall upon the official who—"

"They'll demand my head on a platter," grinned the captain. "Well, with the pair on the collar dead, Tom is no threat to public safety—so you can have custody of him, Bard. But the deaths must have come as an awful shock to Tom. Can you get him into condition to perform? Got any particular psychologist in mind?"

"I think, you know, I'll try Meta Eglantine," said the Bard thoughtfully and smiled.

That afternoon George Apfelstein trailed unwillingly after the Bard as he strode through the dome where Meta Eglantine's residence was located.

"You're risking too much, Vardos!" protested Apfelstein. "Experimenting with our comedy star! Let Tom stay brainwashed until after the Gala!"

"Tom was not brainwashed by a professional hypnotist. He was hexed by a witch, and her death has thrown him into limbo," said Vardos. "He's groping in a mental fog. The spell must be completely broken. I refuse to believe an unprogrammed Tom Tomas will lose his Thespian skills."

"Maybe his skills were a reaction against the hex—an escape—sublimation! Thespians act for the damndest reasons! You can't treat them like *people*! Deprogrammed, Tom may be only a *farmer*," wailed Apfelstein.

Vardos disregarded his manager and proceeded into a terraced block of flats. The gardens, the dome colors, and the false horizons gave every terrace a view/illusion. Meta's residence might have been on a hilltop. When the Bard and Apfelstein arrived, Meta and Tom Tomas were sitting at a terrace table. Meta looked up at them and smiled.

"How delightful that you've come, Mr. Apfelstein! Do sit down. I hadn't expected to meet you until after the performance tonight. The Bard has invited Nick's parents and myself to supper."

Vardos and Apfelstein sat at the table, and Meta filled their glasses from a flagon of Waystation One grape. At a nod from the Bard, Meta began, "I wish Nick could be with us, don't you, Tom? You must have many memories of Nick."

Tom, who had been slumped in his chair, took his hand down from his cheek and responded, speaking to the Bard and Apfelstein, "Nick and Meta made me feel at home on Vesta. I miss Nick."

Meta took another cue from the Bard and continued, "You have memories from much further back, Tom, when you and Nick were little boys."

Tom's eyes widened in surprise, as a memory suddenly snapped free. Tom blurted, "We played in the axle. We liked nongravity. Nick had a mother."

He seemed to go blank. Meta said gently, "You talked to Nick about *your* mother. She had died on Waystation Two, but you still remembered her."

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"I didn't remember what she looked like. Dad said I had her hair and eyes, and I used to look at myself in a mirror and try to remember. Wolf's mother—mother—?"

He paused. "Something is wrong, isn't it? Why are you trying to make me remember? Have I had amnesia? No—impossible—I know who I am—and who all of your are—and what role I'm playing tonight. Yet there *is* a thickness in my head—an unwillingness—and all of you look so grim. Have I been drunk and made a fool of myself—or something worse—?"

The Bard interrupted his increasingly agitated speech. "Do you remember the first time you saw Meta?"

"Of course! The Agriculture Board had called me home, and when I stepped from the airlock—" He paused and smiled a little. "You know, Meta, from that day to this I've never remembered what made you so ill. I remember returning your suitcase—"

The Bard asked, "What were your actions after you saw Meta at the airlock?"

Tom looked seriously at the Bard. "It *is* important that I remember, isn't it? I don't understand—but all of you are my friends—you must be trying to help me in some way. Very well. I said—something—to Meta. I went upstairs, and—and—"

Meta jumped up, smoothed her black skirt and seemed to grow taller, sharper. Then she bent towards Tom and swung her hand slowly, like a pendulum.

Tom's glance followed the movement. His muscles tightened, and sweat gushed from his forehead. "I wont—*won't*—!" He sprang up. "Stop, you damned witch! Stop!"

The Bard rose and slapped his face. "Wake up!"

Tom fell back in the chair, the white streak on his jaw turning red. He looked at the other faces. "She was my stepmother—my *step*mother! And yet I can hear myself saying *mother*—Meta, when I visited you and Nick I said, 'Mother and Wolf'—and you should have known I never would have called that woman *mother*! Why, when I met you at the airlock, I asked for my *step*mother—"

"Now tell us about that evening," suggested the Bard.

"Yes, *now* I remember," said Tom eagerly. "My stepmother said, 'Come along upstairs, Tom, where we can talk without being bothered by the spying Agronom.' And when we were upstairs, she and Wolf wanted me to take a package to Earth. I knew it must be something illegal—Wolf consorted with the worst of the Asteroid mob—and I refused. And then—"

His voice faltered, and his face grew pinched. "I traveled, didn't I? Every year I traveled—between Thespian jobs—and I don't remember *where*! My God, what have I done? What did they make me do?"

Vardos spoke up, "Relax a moment, Tom—take some grape and relax. Then I'll tell you what happened."

The shaken man obediently sipped from his goblet and sat back, a watch-

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ful look in his eyes.

"It all came about because of the way Wolf's mind saw things—in three-dimensional patterns," the Bard began. "Electronic systems fascinated him the way another boy might have liked jigsaw puzzles. He understood at a very early age that an antijamming field was a *pattern* which could be nullified by a *phased* disruptor. The process was twofold, like keying open a lock—*shape* and *force*.

"What was necessary was a translator—or, as Wolf called it, a *decoder* that would pick up and blend into the antijamming pattern, molding its own wave/particle emissions after that of the field—and being of such easily affected elements that a signal could scramble it, whereupon the *blended* field would be broken down. The decoder established the *shape* of the key—and the signal was the *force* that turned the lock. As soon as Nick Eglantine began speculating about inter*locking* fields, he had to be killed.

"Wolf had invented a skeleton key to every antijamming field," continued the Bard, "but he realized he had to be careful how he used it, lest its existence be deduced. He could use it *once*—and never again—to trigger a fire blow-out. *Once*—and never again—to explode a chemical mixer. *Once*—and never again—to cancel a space van's life-support systems."

Tom looked bleaker. "You're saying Wolf killed my father—and the collar neighbor—and Nick. Why did he leave *me* alive?"

"You owned the collar—you were more useful alive. The trouble was, you ran away at eighteen—just when you would have been most useful. Wolf had finally found a pipeline to an Earth organization willing to pay a price for his skeleton keys. The deal hung fire because both parties realized Vestan police had Wolf under surveillance and would note any nontypical behavior—as, for example, Wolf's commuting to Earth.

"Otherwise, they had worked out a viable agreement. A go-between could describe to Wolf the system to be jammed, and Wolf could construct the decoder and signal—but they lacked a delivery man above suspicion, a man the police would never shadow or search.

"While Wolf fumed, frustrated, on the collar, his half-brother-by-marriage was becoming a popular DM-star traveling under the diplomatic immunity accorded celebrities. *Tom* could check into the same hotel as a known criminal. *Tom* could be at the scene of any crime. *Tom* could bring stolen objects to Vesta, where his stepmother, with a magpie's greed, could gloat over them.

"Hence, Tom had to be forced home—and the forfeit order did it. The wrecking of the farm was deliberate. And I think, Tom," added the Bard, speaking directly once again to the tense Thespian, "your stepmother expected you to cooperate because she knew you feared her. You ran way because you had to get out from under her power. Under ordinary conditions, Thespians make difficult hypnotic

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subjects because of their shifting identities. But you had always been *hexed* to some degree—or else you never would have accepted your father's death so unquestioningly—and you were in no state to resist further hypnosis."

Apfelstein spoke up. "Nobody handed me a script for this DM-Continual, and I've lost a murder in the shuffle. The neighbor on the collar—"

"He was killed immediately after Tom's father. And after Wolf and Dame Tomas were dead, I realized *why*. The pair had concocted an alibi for Tomas's murder—but the alibi meant that the decoders were still affixed to the blow-out valves for some hours before Wolf could come back to the collar and collect them. The neighbor, who had answered the emergency signal, had noticed the small metal rectangles—merely noticed them and commented idly. But Wolf was monitoring all the conversations on the collar. He caught the reference—and the neighbor died. When I myself was looking for a sample decoder, since the one that had destroyed the airlock had—uh—disappeared, I realized that the decoders for the first murder must have been in place long enough to have been observed."

Tom asked, "Have you told the police, Bard Laureate?"

"Yes. They'll understand, I'm sure, how you were victimized. They've known Wolf and Dame Tomas so well, you see."

Tom got to his feet. "I must talk to them—they must think me a weak-minded fool! How can I possibly explain?"

Meta held out her hand. "We'll both explain, Tom. Nick worried about you for years!"

Tom looked miserable. "But you must blame me because Wolf killed Nick! My best friend—my only friend—!"

"You are not to feel *guilt*," said Meta firmly. "Wolf and his mother *happened*, the way other criminals have wrought havoc. Three axle collars suffered—because of *them*, not because of *you*. Come talk to the police, if you like—if it will help you appear at the Gala a sane and happy man."

"I *do* feel sane, like a man awakened from a horrible nightmare. And if you can forgive me, Meta," smiled Tom, "I can learn to be happy."

He took Meta's hand, and they descended the terraces.

The Bard said to Apfelstein, "Tom will accept the year's employment with us now. A wife and two young stepsons can be an expensive enjoyment."

"Accept? Accept? But can he still act?" protested Apfelstein. "You woke him out of his former personality! Now his mind is clear—he feels *sane*! What good is a sane Thespian?"

The Bard admitted to himself that he was uneasy about the evening's performance. Tom's comedy role would need finesse and a charming, scatterbrained wit.

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When Vardos returned to Thespian quarters at the palace, he saw the Dhaulagiri code on the DM-tape. He sighed, attached the scrambler, and requested a tachyon-Morse beam to Earth.

Central Communications responded, "One moment, please."

He waited. Nonvisual communication was always irksome.

The DM-tube flimmered to show a line of moving letters: congrats vardos . . . forestalling callisto hijack reckoned security coup . . . no backlash from your double erasure . . .

Vardos spoke, and watched his words glide across the tube: why deduce your humble servant . . .

Back came: only one barddreaming fatheaded idiot would have plugged lasered hatch with frozen cabbage . . . less humor next time . . . over and out . . .

The Bard laughed, glad he was at tachyon-Morse distance from the Colonel.

Opening nights always had the same gut-watering tension, but the opening at the Vestan Pleasure Dome was even more so. Before curtain time Vardos—costumed, greasepainted, and feeling as if lungs and stomach were light years apart—waited on the prompt side with George Apfelstein.

The dancers took their tableau places on the darkened stage. From the other side of the curtain came the muted, tight-massed sounds of a full house—the warm, heavy, winey, perfumed atmosphere of a Gala. The orchestra made tuning-up touches.

Across the stage the electrician had a hand raised to his panel. Beside him stood Tomas, ready for his entrance cue.

The stage manager looked at the Bard. "Hit it," said Vardos.

The footlights went up, tracing a bright line at the base of the curtain. The orchestra drenched the theater with music. The pace had been set. The clock was running. The velvet curtain parted (like the water of the Red Sea, thought Vardos absently) and the dance tableau came to life under a ripple of applause for the colorful costumes and set.

Now the dancers were swinging garlanded ropes in an intricate routine. Tom's cue was on countdown and needed split second timing. Beat—two—three—

A lively, merry ne'er-do-well skipped in rhythm onto the stage—over, under, over the swinging ropes. A storm of applause for the local boy drowned the music, broke the rhythm. As instinctively as the Bard himself, Tom kept the pace from sagging by an extemporaneous hug and kiss for the nearest ballerina. The applause softened into laughter, the music surfaced, the number whirled as it was supposed to whirl.

Vardos breathed a shuddering sigh of relief. He said to Apfelstein, "Tom is as brilliant as ever. A Thespian doesn't have to be crazy, George."

"Tom must be the exception that proves the rule," muttered George Apfelstein. ■

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FUNDING THE FUTURE

Peering ahead to the turn of the century, I see a crowd of people concerned with science—but surprisingly few of them are wearing lab coats.

The crowd is mainly composed of legislators, lawyers, economists, diplomats, budget planners, aptitude testers, bookkeepers, labor union officials, technology assessors and lots of anxious citizens. Few of them can distinguish an electron microscope from an automatic olive pitter. Their presence in the heart of the scientific enterprise signifies the blossoming of a theme that is already with us: namely, science is too potent, costly, dangerous and valuable to be wholly entrusted to mere scientists.

DANIEL S. GREENBERG
July 1976 issue of Smithsonian,
an issue which presented
"A look into our third century."

There's one key question which is basic to all research . . .

M. DAVID STONE

The question is: who's in charge here, and who should be? Who decides which research to fund, and, more to the point, who should decide? With about 50% of the total bill for research and development in the United States being picked up by the federal government, it's an inevitable question.

Unfortunately it's also a complicated one, and like most complicated questions it has a complicated answer, even if we confine ourselves to a single aspect of Greenberg's "blossoming theme."

Consider, for instance, Senator William Proxmire, who clearly agrees that science is too costly "to be wholly

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entrusted to mere scientists."

Proxmire is probably best known to the general public for his much publicized stance against giving federal aid to New York City. He is probably best known to the scientific community for his Golden Fleece Awards and for other press releases attacking various research projects.

Proxmire's "Awards" are given ". . . for the biggest, most ironic or most ridiculous example of wasteful spending (in government) . . ."

Proxmire's intent, obviously, is to focus public attention and political pressure on frivolous expenditures, boondogles, and just plain waste. (Of course it's safe to assume that, being a politician, he doesn't mind the publicity either.) His argument is that the particular piece of research is useless and expensive, a waste of taxpayers' money. His attitude is that the research is so silly it isn't even worth discussing seriously.

On the surface the Golden Fleece Awards seem perfectly reasonable, even admirable. After all, who can complain about a senator who spends his time and energy in an effort to expose waste and save money?

Of course it's not that simple. Nothing ever is.

Take a look at the first Golden Fleece, awarded in March, 1975 to the National Science Foundation:

"For squandering $84,000 to try to find out why people fall in love. They say they want to study this especially between men and women.

"I object to this because no one—not even the National Science Foundation—can argue that falling in love is a science. Even if they spend $84 million or $84 billion, they wouldn't get an answer that anyone would believe . . ."

The full story of the uproar that followed this press release is much too complicated to cover completely, but here are some high points:

James Reston of the *New York Times* did a column defending the importance of the research as ". . . a modest inquiry into . . . (divorce) statistics . . ."

Congressman Burt L. Talcott (Rep., Calif.) entered Reston's column in the Congressional Record along with his own remarks defending the research.

The Faculty Senate of the University of Wisconsin at Madison passed a resolution which, in part, deplored ". . . the damage that is being done to basic research and to freedom of scientific inquiry by irresponsible and inaccurate attacks of the kind Senator William Proxmire recently made on research supported by the National Science Foundation . . ."

NSF made a point of keeping a low profile; Proxmire chairs the subcommittee that votes on NSF funds, and they were not about to wage a press release war with him.

It was not, however, that they did not have an answer.

The following comes from a letter written by NSF's Public Information Branch. It is not in answer to a question, but to a ". . . reaction to Senator

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Proxmire's criticism."

"The criticisms of these grants such as offered by Senator William Proxmire can often be superficial and ignore the underlying real or potential value of the research. Often a part of a research project can be picked out and described out of context, leading to a misinterpretation of the research . . .

"The particular grants on love you are concerned about deal with psychological aspects of human behavior and relationships. They are attempting to understand these aspects in an objective and systematic manner . . .

"An improved understanding to key factors underlying problems in interpersonal relationships is essential to the success of marriage counselling and psychotherapy, as well as to every individual's ability to cope with his or her own behavior problem in relation to other people. These research projects are contributing to this knowledge."

Compare this to Proxmire's ". . . squandering $84,000 to try to find out why people fall in love."

An isolated instance?

No.

Proxmire has prepared "Golden Fleece" press kits. Except for the current year, 1978, these consist of excerpts from his original releases. Under March, 1975, he has included this paragraph:

"NSF is also spending $15,000 to study hitchhiking; $81,000 to study the social behavior of the Alaskan Brown Bear; $25,000 to study primate teeth; and $112,000 to examine the African climate during the last Ice Age."

Here Proxmire has abandoned ridicule for a different technique, one that Louis Lasagna of the University of Rochester School of Medicine and Dentistry describes as ". . . (listing) some outrageous-sounding grant titles, while ignoring the background, rationale, and potential importance of the research."

Well, what about the "background, rationale, and potential importance?"

Hitchhiking: It turns out, according to the Chronicle of Higher Education, that hitchhiking was being examined as a possible way to save energy. This study had been endorsed by the Colorado governor's office and by a Colorado Congresswoman. Moreover, similar hitchhiking programs had already been incorporated into the transportation systems of some European countries. Just to cap things off, the study turns out to be part of an educational program "that is not even primarily aimed at producing valuable research findings, a detail that Mr. Proxmire's office appears to have overlooked."

Social behavior of the Alaskan Brown Bear: NSF was quoted as saying it might save tourists from getting mauled while visiting national parks.

Primate Teeth: NSF was quoted as saying it might help our understanding of human dental problems.

Ice Age African Climate: This one could help determine whether the Earth is warming up or cooling down, a determination that would have obvious practical implications for the fu-

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ture of the human race.

Who's in charge? Who should be?

Brian O'Leary is a former scientist-astronaut. He is currently working with Gerard O'Neill on the High Frontier concept, space colonies, or "space manufacturing facilities." O'Leary has testified before Proxmire on two separate subjects. In one case they were in agreement—*against* the development of the space shuttle (before O'Leary became involved with the High Frontier concept). In the second case they were at odds, O'Leary speaking for the High Frontier, Proxmire coming down against it.

O'Leary describes Proxmire this way:

"He is a unique and complex man. He tends to want to take the responsibility for himself to keep the government from getting into boondogles. He and his staff go to great lengths to find things. Sometimes he's right and sometimes he's not. But he doesn't give a thorough check . . ."

The truth of the last statement is glaringly obvious to anyone who does bother to check. Consider, for instance, the following. It is the complete text of one of Proxmire's press releases, interspersed with relevant comments. Though not a Golden Fleece Award, it is written with the same attitude and approach:

FOR RELEASE AFTER 6:30 A.M. WEDNESDAY, MARCH 29, 1978

Senator William Proxmire (D-WIS.) Chairman of the Senate Appropriations subcommittee with jurisdiction over National Science Foundation funds said Wednesday, "Our hearings have established that the National Science Foundation has spent $405,600 over the past seven years to fund an Ohio State University project to develop a 200-pound, six-legged slow walking robot called 'The Bionic Bug'."

Well, not exactly. The NSF release, dated April 26, 1977, gives a slightly different view:

"Development of the 200-pound (100 kilogram) aluminum buglike device capped 10 years of theoretical studies and two years of construction by a group headed by Dr. Robert B. McGhee.

"Officially named the OSU Hexapod Vehicle, the prototype device has been dubbed the 'Bionic Bug' by those who worked on it." Note the word *prototype;* it becomes important.

Proxmire's release continues:

"While according to a National Science Foundation press release, this walking machine could be used in 'hazardous and fragile environments such as forest and frozen tundra,' this explanation seems far fetched to me."

Again, not quite. The NSF release:

"An Ohio State University electrical engineer has developed a prototype of a future 'walking machine' for use in hazardous and fragile environments . . ." Again, note the words: ". . . *a prototype of a future 'walking machine'* . . ." It certainly would be far fetched to expect "a prototype" to be used in any such way.

Back to Proxmire. At this point he

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lapses into ridicule:

"I think it's likely to be more useful in the Ohio State backfield.

"How appropriate that this $405,600 robot was developed at Ohio State—home of the legendary 'Buckeye' football coach Woody Hayes. Wouldn't Coach Hayes love to get this solidly built 200-pounder with six legs out of the laboratory and on to the gridiron to run the ball for his Big Ten Champs or to back up the Buckeye defensive forward wall? Coach Hayes could rename the 'Bug' the 'Bionic Buckeye.'

"This new Buckeye would fit perfectly into Ohio State's supremely boring style of play. It walks at a rate of only five inches per second, which translates into a 12-minute not 12-second but 12-minute 100 yard dash! But since the 'Bug' travels a distance of 30 feet (10 yards), it would be assured of making a first down every time its signal was called. So it could convert Ohio State's great tradition of 'three yards and a cloud of dust' on any rainy Saturday afternoon into ten yards and a cloud of rust."

Buried in that last paragraph are two interesting statements: "It walks at a rate of only five inches per second . . ." and ". . . the 'Bug' travels a distance of 30 feet . . ." The implication of course is that the 'Bug' is so limited in its capabilities that it couldn't possibly be useful for anything.

Once again, not quite. Here's the NSF release:

"The two foot high, four foot long machine, which walks with the gait of an insect, now can amble along for only 30 feet—the length of its electrical cables. McGhee plans eventually to mount the computer controls on the device and operate it by radio . . .

"The laboratory model can travel five inches a second. According to McGhee, a production model could go faster, but would never be able to go as fast as a wheeled or tracked vehicle because legged locomotion has built-in design limitations." Again, note *laboratory model* versus *production model,* a distinction the senator seems to have missed.

"The device was successfully tested recently at McGhee's laboratory . . .

" 'Currently,' he said, 'its performance is grossly inferior to that of even simple animals. This is due in part to the fact that the present version of the machine lacks any means for sensing its interaction with the ground. It's like a person walking on anesthesized feet. Future improvements will remedy this shortcoming.'

"McGhee has received a new NSF grant for $125,000 for two years more of development work. During this time he plans to adapt the gait of the machine for rough terrain and to make it possible for a human operator to steer and operate the device through a computer with a control stick. The machine will be fitted with six new legs, each having three sensors—one to sense vertical force and the others for horizontal force."

Proxmire again:

"The research project, entitled,

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'Computer-controlled Systems for locomotion and Manipulation' was originally sponsored in part by the United States Air Force Office of Scientific Research in 1964, with the National Science Foundation Engineering Division picking up the tab for the project from 1970 to the present. The principle investigator is widely recognized as a well-respected, highly skilled researcher with a long and distinguished publishing record, and I in no way want to demean his expertise as a first rate electrical engineer and scientist." (It should be noted in passing that in past attacks Proxmire has been accused of doing just that—demeaning the expertise of the individual researcher. As a result, one of those researchers, Dr. Roland Hutchinson, filed a $6 million lawsuit against Proxmire in April, 1976. The suit alleged that Proxmire's "erroneous summations" of Hutchinson's work led to a loss of professional respect and to a loss of some research support. Proxmire has made a point of including this sort of disclaimer in his press releases ever since). *"But the prospect for future applications of his six-legged 'Bug' leaves this Senator wondering why Ohio State shouldn't pay for this out of football revenue or forget it."* Ridicule again.

"The National Science Foundation contends that 'further research with the Bug could result in machines useful in such applications as underwater explorations, firefighting, mine rescue operations, and even in hostile environments of a distant planet.' "

True enough, it's a direct quote. *"But the principle investigator who should know best, said in a telephone conversation with a member of my staff last year that he was less optimistic about the 'Bug's' applicability. In fact, he said at the time that possible use of his invention centered around 'Russian conjectures about a possible use of related technologies in the tundra and in some forest logging operations' and that even these were 'highly conjectural.'*

"Since that time he has indicated that there may be other applications in the area of prosthetic and orthotic devices for humans. That may well be, but I would doubt that his six-legged, 200-pound robot that walks with an 'insectlike' gait will be of much assistance to those needing such prostheses."

Up to this point, the differences between Proxmire's release and the NSF's release are relatively minor—differing views of the same thing, the difference being dependent mostly on attitude. But compare the above two paragraphs with the following from the NSF release:

"McGhee said he thinks the walking device could be especially useful in the permanently frozen tundra of polar regions because it might cause less damage than tracked vehicles, which leave scars lasting as long as a century.

" 'The basic type of transport in forests and tundra,' he said, 'is the caterpillar tractor, which heavily damages the ground cover. Destruction of

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the insulating growing layer leads to melting of the soil in regions with permafrost and to the development of depressions and ruts.

" 'This problem can be solved only partially by means of road construction. In exploration of forests and tundra fundamentally new types of transport are needed, compatible with fragile and easily damaged ecological systems. It may turn out that legged vehicles will provide an answer to this problem.' "

Note the dates. Proxmire's release is dated March 29, 1978. It is quoting McGhee "in a converstion with a member of my staff last year." "Last year" means sometime in 1977. The NSF release is dated April 26, 1977. Did these quotes really come from the same man?

Look carefully at the NSF quotes again: ". . . the walking device *could be* especially useful . . ."; ". . . fundamentally new types of transport are needed . . . it *may turn out* that legged vehicles will provide an answer . . ."

Two different ways of looking at the same information? Maybe.

Robert H. Snyder, writing in *The Plain Dealer,* pointed out that:

"Proxmire's cute remarks resulted in front-page stories across Ohio . . .

"But a further look into this matter revealed that it was Proxmire's research that was faulty and worthless, not McGhee's. . .

"McGhee said that, when questioned one year ago, he tried to suggest to Proxmire's aide the difference between basic and applied research."

Synder quoted McGhee as saying, "It seemed that Sen. Proxmire's representative wanted to know about immediate application. I tried to explain to him the role of the National Science Foundation is not to produce new devices or new kinds of machines but to produce new knowledge."

The nature of the quotes in Proxmire's press release begin to make sense. Proxmire's aide was asking for immediate practical applications. McGhee answered by trying to explain the nature of basic research.

And this appears to be the crux of the problem.

Basic research is, as McGhee implies above, a search for new knowledge, a kind of scratching around,

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looking for information that may or may not turn out to be applicable to a particular problem. Almost by definition, it is impossible to justify basic research in terms of immediate practical benefits, or even foreseeable practical benefits. If the researcher knew what he was going to find, the research wouldn't be necessary.

In February, 1975, Dr. H. Guyford Stever, then Director of the NSF, testified before a subcommittee of the House of Representatives. He was asked to explain why the NSF persists "in supporting research whose results have no apparent value to the American people." He said, in part, "Basic research seeks an understanding of the laws of nature without initial regard for specific utilitarian significance, because in a broad sense it is the foundation upon which rests all technological development."

Isaac Asimov, in an introduction to an NSF publication aimed at showing how "past and present research directly relates to our lives," says of basic research, "The point is that we cannot foresee the consequences in detail . . .

"We can only make the general rule that, throughout all of history, an increased understanding of the universe, however out-of-the-way a particular bit of new knowledge may seem, however ethereal, however abstract, however useless, has always ended in some practical application . . ."

Which brings us back to the case of the Bionic Bug.

In March 1978, NSF issued an information sheet about the 'Bug':

"This research . . . can be used to help solve the problem of physical rehabilitation of handicapped persons requiring powered devices as substitutes for missing or impaired limbs . . . The U.S. Veterans Administration, for example, is sponsoring the development of a microprocessor-controlled prosthetic knee joint which is a direct outgrowth of this research. It will be tested in April, 1978, by the VA's Prosthetic Center in New York City.

"Results of this research have already been applied to provide the instruments for a gait laboratory in Ohio State University's Department of Physical Medicine. The purpose of this laboratory is to diagnose and help persons with spinal cord abnormalities and walking difficulties. The laboratory also is being used to help amputees walk with prosthetic devices."

In addition, the Jet Propulsion Laboratory of the California Institute of Technology found the project to be "very impressive." JPL is interested in planetary rovers for exploration purposes—particularly for Mars.

Snyder, from *The Plain Dealer,* pointed out some of these practical applications to Proxmire aide Thomas L. van der Voort, head of the staff of the Senate appropriations subcommittee which is chaired by Proxmire.

Van der Voort, according to Snyder, "began to backpedal on the criticism."

"I'll have to tell that to the guy who

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wrote the release," van der Voort said about the knee joint development, "That's a pretty good defense."

Van der Voort added, "I didn't talk to him (McGhee) but a member of our staff talked to him a year ago and he did not make that point."

Two things to note here: First: ". . . a year ago . . . he did not make that point." Exactly. If the researcher knew precisely what he was going to find, and where it would lead, *he wouldn't have to do the research.* It would not be basic research, but applied research. Second: "That's a pretty good defense." The thinking behind the statement is that a practical application in the here and now is "a good defense"; a "probable" or "possible" application in the future is not.

The NSF fact sheet:

"Scientific Significance: . . . The vehicle was designed to serve as an experimental tool to test theories and acquire data to improve the theories. The vehicle enables researchers to study a number of basic problems involving mathematical modeling, feedback systems, and man-machine interaction. It enables them to study how to manipulate and control locomotive functions by electronic means and to experiment with instrumentation systems to assess gait, posture, and the motion of joints somewhat similar to the knee or elbow."

The point is that the machine enables researchers to *learn.*

Proxmire tripped up on this item because it happened that the 'Bug' wound up demonstrating its worth almost immediately after he lampooned it. But this research had been going on for ten years before Proxmire found out about it. If Proxmire's press release had come out five years earlier, there would not have been any immediately useful applications forthcoming.

Would that have made the research any less valuable?

Would the publicity have forced NSF to cut off the funding?

Who's in charge here? Who should be?

In 1975, reacting to Proxmire's first Golden Fleece Award, the one given for "trying to find out why people fall in love," a spokesman for NSF pointed out that what Proxmire was really objecting to was using money for basic research.

Proxmire makes this clear in the last paragraph of his 'Bionic Bug' release:

"What this project tells me is that the National Science Foundation's Engineering budget is too fat. The Foundation is requesting $49.6 million for its basic engineering program in fiscal 1979—an increase of $4,000,000 over the amount provided in fiscal 1978. At a time when most American taxpayers are gritting their teeth and paying their taxes, the expenditure of $405,600 for this six-leggd robot bugs me."

Richard Atkinson, current director of the NSF, has said, ". . . basic research is research where you're just not going to see the economic consequences, the practical benefits for

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maybe 15 to 20 years."

The question is whether basic research is a luxury that should be put off.

In 1975, the NSF spokesman put it this way:

"In times of need, do we need this kind of study?"

Proxmire, obviously, says no.

NSF, obviously, says yes.

Atkinson gives this example of what basic research is about:

". . . (consider) polio in the thirties. What if the government had said, 'We're going to solve polio right now; it's going to be a national effort.' Well, what would we have ended up doing? We probably would have ended up building the best iron lungs one would imagine, because that's all the knowledge we had at the time. But the solution for that was the polio vaccine a few years later. And it was basic research that opened up the solution."

It could be called selfserving, but the fact is that scientists in general tend to emphasize the importance of being left free to do their work, both for the good of science and ultimately for the development of practical applications. Victor Weisskopf, the physicist, put it this way: "Science cannot develop unless it is pursued for the sake of pure knowledge and insight."

Proxmire disagrees.

Judith Miller, writing in the September 1976 issue of *Human Behavior*, reports that Proxmire ". . . feels that scientists, in general, do a good job of awarding grants . . ." She then quotes him as saying, "They're not God; they occasionally make mistakes and therefore must be scrutinized."

Proxmire ". . . feels that scientists tend to suffer from what he terms an 'elitist arrogance,' " Miller says, "a feeling that science is too important to allow politicians to interfere."

She quotes him as saying, "Ignorant or not, this is a democracy, and we've got to make those kind of decisions."

And Proxmire is not, of course, the only one who feels perfectly capable of making decisions "ignorant or not." Nor is he the only one who resorts to uninformed ridicule; he is merely the most visible and most consistent practitioner of this particular political game.

Consider this exchange from a *60 Minutes* broadcast in March 1978. The "investigative reporter" is Andrew Rooney. He is interviewing Dr. Roy Huffman, vice-president of research at Montana State University.

ROONEY: Aren't all of these projects a form of intellectual welfare?

HUFFMAN: I don't think that's a fair way to describe it, because research is an impo—important part of a university's function.

ROONEY: It seems to me that if most Americans knew that universities were getting this much government money, they would strenuously object to it.

At the end of the report Rooney said, "What we (saw) was a little of how $900,000 of our tax money was spent. I hate to think of my tax contribution going into it . . ."

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Please note that Rooney felt perfectly competent to decide that the research was a waste of money, yet one of his major objections was that he didn't understand the reports.

Who's in charge here?

Who should be?

It's a serious question that goes far beyond a fight over political turf. At stake is the very nature of the "scientific enterprise" in the future, and with it the shape of society, for as Brian O'Leary has pointed out, the research and development of today determines the technology which will dominate our lives twenty-five and thirty years from now.

The fight is between two approaches to science, two ideas of what it should be. The differences between the two are vast.

The attitude of the one group is that of an unimaginative cost accountant who ". . . (can't) distinguish an electron microscope from an automatic olive pitter," yet insists on deciding which of two electron microscopes is the better buy.

The attitude of the other group is perhaps best summed up in a statement made by Robert Wilson. In his capacity as director of Fermilab, Wilson was once asked by a senator to explain what, if anything, his laboratory had to do with the security of the United States.

Wilson said, "It has nothing to do directly with the security of our country except to help make it worth defending."

Wilson's answer is not convincing except to the converted; it is too easy to dismiss it as intellectual snobbery or to read it as a weak defense of a luxury—basic research—which can easily be done without. The charge of "intellectual welfare" hangs in the background, easy to make, hard to defend against.

Yet the historical fact is that the "squandering" of time and money on "useless," "speculative" basic research has consistently paid off in practical economic and social benefits that far outweigh the money invested.

We have, for instance, radio and television which grew out of Faraday's "useless" work on electricity and magnetism.

And we have a space technology (which allows us to launch weather satellites and communications satellites among other things) which grew out of Goddard's "useless" work on rockets.

And we do, after all, have a polio vaccine rather than a portable iron lung.

So the question remains: Who's in charge here, and who should be? Who decides which research to fund, and who should decide?

The answer is multiple choice:

The scientist who understands his particular field and participates in the process of peer review in deciding which proposals are worthwhile?

Or the cost-accountant-politician-reporter who complains he can't understand the scientific language?

Pick one. ■

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CAN THESE BONES LIVE?

TED REYNOLDS

JACK GAUGHAN

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She spins in space, a mere point of view, and far away the stars wheel slowly about her. Curiosity builds, and with gathering intensity she strives to see, to pierce through those uncaring flares of silence. With effort comes strain, comes pain, mounting in linked agony with her struggle. The stars begin to shimmer and melt, the blackness coating the universe beyond them to ripple, thin, transluce . . . and then the pain mounts past endurance, she gives over in defeat; victorious night rolls back, a ponderous black drop framing meaningless lights. The pain wanders off somewhere, leaving her limp with exhaustion, and for ages she hangs bodiless in nothing, the stars sliding steadily past her vision, until once more she will be ready to try to see *through* . . .

She woke.

She lay on the soft slope of a swelling which rose gently in the middle of a wooded noplace. Sun beat down warmly on bare shoulders. She lay a while, blinking her eyes, the dream fading away as consciousness grew that something was wrong, unexpected.

Finally she sat up and looked at herself. In sudden panic reflex she whipped herself over and burrowed belly down, as best she could in the short grass. She lay there, breathing

What would you do if you were the last human being—and were offered one wish?

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rapidly, as minutes passed with no sound but quiet wind and distant bird, no movement but that of a small industrious ant a few inches from her eyes.

Slowly raising her head, she scanned the horizon cautiously. Mellow dips and swells. Shrubs in flower, a few drifting cirrus high, high up. A bird flitted twittering across the sky. No one in sight.

Thank God. And she lying here in the open, stark naked . . .

Squirming on her stomach like a celluloid Indian, she negotiated her way to the nearest bush, where she squatted for a longer look around. Not a soul anywhere. How did she ever get herself into *this*! Well, first things first. Times enough to think of reasons after she'd found herself something to wear.

She reached the top of the rise; the world spread about her lovely, lonely, bare as herself. No house; no road. An opossum curled under a bush, ignoring her. She sat there in bewilderment, and gradually another thought grew in upon her, something else that didn't make sense, that wasn't quite right.

She had died. She clearly remembered her death.

By late afternoon, fear that someone would see her was being supplemented by fear that no one would. Still unclothed, but bearing a large portion of bush before her, she moved down the slope of a hill towards the rivers, lying beneath her in leisurely looping swaths which gleamed in the sunlight.

Anywhere in her part of the world, she thought, there would be some sort of town at the confluence of two rivers of this size. Here was nothing but the grassy slopes, studded with isolated groves of slender trees, slurring off along the river borders into marshes and mudflats where waterbirds splashed and fed. No river traffic; no jet trails; no.

It was now clear she was heading west, at least if the sun kept to the old path . . . if that *were* the old sun. At this point, she wasn't laying any odds.

When the moon rose, its familiar face told her she was on Earth after all. But wasn't it a shade too large? No, don't think about *that* one! It's just the right size.

Perhaps, she thought vaguely, she was Eve? Was Adam around the next bend? No, far more likely she was around the bend.

That night she huddled beside a fallen trunk; not for warmth, (she discovered for the first time, *emotionally*, that trees are not warm-blooded) but for the rough contact with something solidly actual. Staring blankly up into the featureless night, she retreated into her memories, recalling the tubes and needles and pains, the fading lights and voices and her dying. The last things she could recall were those instants of observing the operation from outside of her own body, and realizing even then this was only her

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mind's final defense mechanism to soften the inevitable annihilation—and she had *known* it was for keeps. So why hadn't it been? Why was she here? And why wasn't anybody else?

I can't hold a Jehoshaphat, she thought, all by myself, can I?

The night was warm, the trees stoically silent. The largest animal she had seen all day was a badgery or woodchuckish thing looking out of a hole in a clay bank. That kind of fear didn't touch her now. Just the one cry filled her mind as she fell asleep. How am I here at all; why aren't I still dead?

She didn't really expect a reply. She got one.

She was standing on the slope where she had first awakened, and was looking out across the world when the Roanei appeared, quite abruptly, as their habit always and everywhere is. She watched them as they debarked themselves and spread out for picnicking, and she understood them, as one will in a dream, and at the same time knew that neither the way they had arrived nor the way they looked would make the least bit of sense to her when she awoke. She couldn't even be sure if the Roanei were many, or was one.

One of them, or part of it, appeared at her side. A truly lovely little world, it indicated somehow, and, oh, my, it went on in exaggerated surprise as if an adult condescending to a child's make-believe, what have we here? It signified the ground at her feet where a minute gleam sparked the soil. It uncovered the gleam and withdrew a shining bone. The Roanei totality flowed around the spot to contemplete the discovery.

The one turned to her and waved the bone gently. So there was once a species of some accomplishment on this world, it rendered cheerfully, and now there are no more of it. How interesting. Reconstruction is in order. It tossed the bone on the earth, where it lay as the Roanei resurrected it, in that unique way of theirs, which they make appear so simple, and which perhaps really is simple, only they never let on how it's done. In a gradual, perhaps mildly obscene process the bone became her own unclad unconscious form.

One aspect of the Roanei turned to her dream portion and conveyed, you know we are nothing like this, but it will serve you well enough as symbol, all of this is metaphor, it chanted,

is metaphor,
is metaphor,
all of this is metaphor
for a somewhat complex reality.

It touched her forehead. Your questions will be answered, it remarked. Forever farewell. And they were gone.

At least that was as near as she could reconstruct the dream when she woke by the fallen log.

The dream stayed solidly with her as she wandered down the way of the river. It had been very real, had

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spoken with authority, not as one of the scribes. Either it was a message, a real answer to the question she had fallen asleep with, or her dreaming self now had resources of imagination she'd certainly never had her first time through life. She would rather have dreamed of frustrating cocktail parties and ominous taxicabs the way she'd used to.

An *authentic* dream? She wished there were some around (among other reasons) to ask whether this fell within *their* range of experience. It might well be one of those numerous everybody-else-knows-it-happens-but-nobody-thought-to-tell-*me* phenomena.

She went on, and the further she went, the more people she didn't find, nor their leftovers. She found and munched berries, drank from the river, and didn't die a second time on the spot, though the diet hardly excited her. She went to some lengths to find *something* to wear at first, with the dogged persistence of an Edison trying electric light filaments. Eventually she found a kind of tree, from which the bark came off in fairly large slices, and lashed herself up in some of it with creepers. She called the tree 'birch' provisionally, and thought there might never be anyone to tell her if she had guessed right.

The vestments were rather unpleasant to wear, and already seemed a waste of time and modesty. She could no longer really believe there was anyone left to see or to know or to care.

It appeared a beautiful world, if one cared about such things. Summer, she supposed, nature at its most prodigal expansiveness. Nothing hovering here of Man, not even a dwindling fond memory. I wonder, she wondered, how they finally managed to do us all in, but she soon found she'd rather not think about that.

For several nights she carefully kept that, and all other questions, out of her mind as she composed herself to sleep. She wasn't ready for any more answers just yet.

Sometime during the second week of her second life she gave up on her leggings completely. They seemed quite superfluous. She decided to carve a diary on the bark instead.

She scratched with the sharp end of a stick.

"Dear Diary:

"In order to preserve my sanity, in case I've still got it, I shall write what occurs in proper order. Or in case, in my lonely senile years, I forget the earlier days of this second fleshy incarceration. Or rather, that I may inscribe the relevant facts within which lie the clues I may be someday able to decipher, as to the reason for my improbable situation. Or maybe for the hell of it. Anyway, I write.

"Item: what we used to call humanity is gone, extinct, obliterated. There's just me, alone, at a time seemingly long after the close of man's gory story. I have found some suspicious mounds, but within them, as deep as I've cared to dig, no paper, wood, or metal, nor plastic nor ceramic. A couple of bones. But for all I know, not

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even human bones.

"So I linger on, long after the multitudes have passed from off the stage of life. This, then, is a posthumanous diary.

"Ouch. That wasn't very successful.

"Hell, one tries to write pretty, even to a private diary, in the vague feeling that someone sometime will read the words. Even when I was a girl, locking my personal diary in my desk, screaming in wrath if my brother entered while I was writing, somehow I wrote for everybody, for posterity maybe. I winced at a grammatical lapse, an awkward phrase . . .

"What does it matter now? I'm everybody else's posterity, and they've left nothing for me to read.

"But I do seem to have strayed from the subject . . ."

Thus far took many hours, and endless pieces of bark. She realized she couldn't lug all that bark around with her. She also found she couldn't even make out a lot of what she'd just written. She gave up her diary.

A little later, threading through breast-high wild grasses down a shallow valley, her dream recurred to her, bound up somehow with trappings of guilt. She tried half-heartedly to dismiss it. So what if she couldn't remember dreams with such authentic auras from her earlier existence? Hadn't she been absolutely convinced by other auras, that afterwards, to her sorrow, had proved quite meretricious?

Still, she couldn't pass it off as just another dream. For one thing, if it was more than a dream, if it somehow embodied honest-to-God's-sake truth, then it was probably very important.

She sat down where she was amid the grasses and tried to work it out. If one quite impossible thing had happened—she *had* come back to life—then why not think of other impossible things? Like maybe the whole human race could be brought back.

If me, she thought, why not anybody else? Why not everybody else?

And then there would be plenty of people to read my diary. Isn't *that* worth something?

She lay on her back where she was. It was a moist day, and she stared up past the long stalks gratefully condensing droplets from the hazy air, to the heavy blade tips far above her, and thought hard. She thought all the afternoon, and finally fell asleep in the same spot with a single question, cut and hewed and placed upright in the forecourts of her mind.

"Can *everybody* be brought back to life the way I've been?"

And answer came, of a sort.

She stands on the Moon, on the harsh dead lunar soil, and watches the Earth in the sky, so beautifully smeared in its streaky whites, blues, browns, greens that her throat throbs with longing. It hangs up there in the black, unmoving, unwinking, and she watches it in the cold and the silence.

A speck of red, tiny but fluid, appears at the rim of the sphere, out

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of tune, oddly malignant. It grows, flings out extended filaments across the globe, which coalesce, puddle together, as the Earth slowly becomes tinged with crawling, hideous with roiling, bloated with loathsome red, until the last touch of green is extinguished; and at that moment the whole creeping cancerous red Earth . . . opens up . . . into a . . . perfect white blossom floating serene and still and beautiful on the face of darkness . . .

Do you really want it back the way it was, ask the lunar rocks in their barren silent idiom.

It's not clear why you'd want the whole race back, blazes the sun, shining down eternally, up top left center, but you can always ask*; not promising any reply.*

Ask once only, *that is, tinkle the constellations, strewn endlessly across forever. It is tedious to consider invalid requests. One individual per species is usually* quite *sufficient.*

And the Earth, silent blossom, silently whispers, be very sure before you ask. Cannot unwish wishes once wished. Remember . . .

And just before she wakes, one very brief glimpse of a withered hag, creeping under the weight of a string of sausages firmly welded to the tip of her nose.

That last touch might account for the intense irritation with which she awoke. It seemed to be rubbing it in a little *too* much!

She had been around long enough that the season seemed to be changing. With an abrupt memory of what winter would mean without civilized amenities, she headed south.

A few months of utter solitude, and she was about ready to take the Roanei up on their offer, or challenge, and ask for the return of humanity. But the terms in which the matter had been couched had somehow kept her up till now from requesting a total species regeneration. She hadn't been able to bring herself, quite, to fall asleep with that demand in the forefront of her thoughts.

She headed south, wondering if she were on the North American continent, or if that geographical distinction didn't mean anything any longer. She had no idea how long it had been since the Age of Man. Some animals and constellations were quite familiar to her, others she felt she should surely have been aware of it they'd existed before. But maybe not. There were no large animals, predatory or otherwise; she ate randomly, things bland but sustaining; she never grew ill. She passed various flora, fauna, and geography, and paid little attention, existing most often by choice in the world of her own thoughts. She played there - are - other - people - somewhere games till it hurt too much.

She wished she were a logical thinker, a scientist or something, rather than an ordinary nobody-special. Here they brought back one person, and perhaps the future existence of the

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whole race hung on the person's decisions, and it was only her. It didn't, somehow, seem very fair. She wasn't all that bright, why didn't they bring back Einstein or von Neumann or somebody, who could figure out what to do in these really rather unprecedented circumstances? I mean, she thought, if I've virtually got to decide whether to ask for the resurrection of the whole human race, hadn't I ought to be a better representative of the species? Why couldn't they have snagged Gandhi or Schweitzer?

She knew what she should do, she thought—ask them for the whole human race back. Then she wandered off into wondering if that included the ancient Romans and Egyptians, or just the last generation that went defunct. There'd be population problems again. She wondered if she'd be allowed to pick and choose . . . "no Albanians or Victorians, please" . . . and realized she was off the track again.

Why *not* ask for the race back? What countervailing factors were there? They said she could *ask*.

Not, she had to admit to herself, that she'd ever been a true mankind enthusiast. She'd liked some people, sure. But she'd never reached the point, never lived long enough, maybe never *would* have lived long enough, to accept the existence of others with that wholehearted acceptance with which she accepted her own.

Of course she felt very strongly the responsibility, (if her dreams weren't just dreams,) of being the one who *could* decide, any night now, whether humanity should be brought to life again. But humanity had never turned her on. Of course she would like someone, almost anyone, to talk to, to write a diary for, to show things to, to sleep with . . . that was not meant, that was to be censored, please ignore . . . surely, you understand what goes through the mind, through the body, when one is *alone*. Forgive . . .

Who was there to understand? Who to forgive?

She eventually came to a conclusion, and with it, came back to awareness of her surroundings. She had attained different types of foliage than she was used to, less stark and noble, more entwined and languorous; her images of the south, bayou and magnolia and mangrove, seemed to be closer. South, she thought, how much further?

She found some hammocky roots and made herself comfortable, determined to do this thing right. The onus had fallen on her, for whyever, and she would pick it up and get it over with. She must be cunning and clever, pit herself against the Roanei for the lives of her own unreborn species. These Roanei will have their price. For sufficient reason, they'll resurrect. Find the price, persuade them, convince them . . .

Sleepline, to be held into the night shadows. "What must we pay you for the rebirth of mankind? We'll pay you anything. Name the price."

And slept. And dreamed.

It crouches towering against the

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stars on a pinnacle ridge, far above her, black against the sky. Its clutching talons curve among the rocks, its hawk features jut proudly upwards against the cold sparks of fire. It is utterly awesome and arrogant.

She knows, in her dream that she sees the last, the resurrected speciman of the Mnestepoi. He is making his great pitch to the Roanei, and is he laying it on strong! Power he offers, in all four hands, and knowledge unimagined, and riches untold. It is a bit hard to follow, because it is full of concepts she can't quite get her mind around, but the idea that the Mnestepoi hold the riches of all yearning, the knowledge of all ages, the powers of the universe, comes through loud and clear. And all these will be for the Roanei alone, if they'll only bring the rest of the Mnestepoi back to life. The Roanei can rule the universe forever, cries out that thing on the crag, they will have the cosmic mastership the Mnestepoi had planned for themselves and almost attained, would have attained but for one little unforeseen accident which had erased them. All will be for the Roanei, the Mnestepoi will be their humble servants, if only they can live. If a few of them can live. If a single mate can live . . .

And from among the stars, from that distant wherever the Roanei have got to, comes the answer.

"What would we want with power, you call it, with riches, with knowledge? These mean nothing to us. We do not comprehend the value you put on these things, nor do we care. The answer to your request is no."

And with a shriek of despairing rage, the last of the Mnestepoi hurls himself with ravening fury at the sky, hangs clawing against the stars, and plunges to sickening destruction on the cliffs beneath.

It shook her up a bit, that dream. She felt at the time that that creature could actually deliver what he promised. If ever she had felt the cold beat of power, it was in the looks and the speech of that monster. She had to admit she was sort of glad that the Roanei didn't take him up on the proposal. Maybe she was being provincial, and the Mnestepoi were just grand folks when you got to know them, but still . . .

And she never thought again that the Roanei might be bribable—not with anything man had to offer . . .

She had stopped going south. She had run out of things she knew were good to eat, and had to face learning all over again, or staying up where things were more familiar. It had come to her with a sort of unpleasant realization that there wasn't a thing known to be poison that wasn't found out by a lot of people dying rather unpleasantly. As the last human being, there was need to be more careful of her existence. She'd have to accept a few cool nights.

So much for her half-planned scheme of getting across to Africa where her memory told her the Atlantic was narrower. (If she *was* in Amer-

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ica, and if the continents hadn't drifted) and seeing if any traces of the pyramids or the Great Wall of China could still be traced. She'd stay around here, wherever that was, and try to make friends with the animals that looked like rabbits but acted like squirrels; they looked the most tamable. She'd never been much for pets before, but circumstances alter cases.

She couldn't forget her responsibility completely. It came creeping back into her mind in subtle ways, alternately making her curse herself, the Roanei, or the rest of humanity. Another day arrived when she realized she'd have to try again. She couldn't let her own hang-ups keep her from seeing if she could bring back humanity. It didn't matter what she thought of people, whether she liked them or not. It was a trust, like when her mother had given her money to buy something at the grocery, and she'd had to get what Mama wanted, even if she'd rather have had bubble gum instead. Anyway, if mankind can be brought back, she thought, it will have to include some psychoanalyst who can make me feel better about it all.

Man must be brought back; the Roanei have to be convinced we're worth saving. Why? Why indeed?

She walked to the top of a hill to sleep. She gazed out to where a shallow sea drowsed on the horizon. The climate was definitely softer this life, yes, and healthier. She never felt the need of constructed shelter. She lay down under the deepening evening blue and pondered her approach.

She planned her dream query, etched her question with all her subtlety, and the selective memory of an arts major the first time around. She ran over in her mind all that man had made of wonder and beauty, for it was all part of the question. She let her mind, dimming toward sleep, dip and soar over the finest she knew of man's creations; the spacious perspectives of the Taj Mahal, and the clumped hallelujah of Manhattan, Raphael's wistful Madonnas and the bleak clarity of Hokusai's ink line. She ran trippingly over Dante and Milton and Goethe, dipped into Keats, dabbled in Shelley, flirted with Swinburne, hovered over Blake, soaking in from each only the beauty, the feeling of joy she had received when she had first met them. In her preplanned tour she conjures up what she knows or imagines of Babylon and Athens and Samarkand, Louis XIV's Versailles and Charles II's London, Shakespeare and Michelangelo, Dostoevski and Klee and Melville and Miro and Bartok and Pynchon, and as she feels herself slipping into the nightly oblivion she rolls it all up in a single ball of ultimate question, a cry of the heart, "Can you let all this die? Don't you care to bring back all this creation, this searching for beauty and truth and loveliness . . . this *humanness* back?"

And she falls asleep. The hard thing in this case being to *avoid* certain humannesses.

And she dreams.

They are the Coronolee. What they

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look like is irrelevant. It is what they touch that matters. They stroke the rocks and the trees till they respond in joy and beauty. They build mild cities that fondle the seas and skies, plant gardens that woo the earth; and grow in skill and art and scope with the ages, till all they handle becomes a wonder and a delight. All that see the works of the Coronolee exclaim "Ahhh, yes!"

They soften their suns to mellow hues that gentle all they fall upon. They form worlds from which one would willingly never part, where momentary existence is a flowing environmental caress. They meet other races and speak to them and touch them and somehow, species with hard edges and callous beginnings and mean needs begin to warm and soften and flow in beauty.

And of a mere moment, as the universe plunges through time, the Coronolee are gone. Something had happened to them or been done to them or . . . anyway, it was so ugly, such *bad art, that they went quietly.*

And—how long after, who knows—the Roanei arrive and hear of the extinct Coronolee, still somewhat of an epic in that part of space at that time. And so, as they always do, the Roanei resurrect one member of that species, and leave it alone on the barren remains of one of the Coronol worlds, amid the relics and wreckage of departed splendour, and depart—leaving, of course, a dream-channel link. And the last of the Coronolee lives a short space, as their livespan goes, puttering about the shards of beauty, trying to set things to rights, and then asks from the depth of its heart and the height of its soul that its people might be brought back from nothingness to correct this ugliness. The Roanei hear immediately from the far places they were then in, and answer:

No. What value is there in the things your people have done? None of them matter to us at all.

And the dream link is broken forever. And the last Coronal dies, in shame and chagrin, at the ugliness of the world. And no one ever lives there again.

That was her dream. It was quite discouraging. In the face of what the Coronolee had achieved, even what she could rescue clinging to from the wrack of dream, what man ever did seemed not a little childish. If she'd ever loved anything human, it was the arts, but compared to what *they* were capable of, even Mozart and Seami looked like the triflings of a child that may amount to something someday if he ever grows up and doesn't get too snotty.

And *they* didn't impress the Roanei one smidgeon.

She had lost, she knew, another round.

She lived pleasantly enough under the trees, that might be oaks or beeches, or banyans for all she knew, surrounded by her squirabbits, and on the whole content. Time passed, usu-

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ally without her noticing or being bothered by its passing, but once in a while she was reminded by something or other of time passing and duty undone, and went through a heavy guilt session.

It was really a bit chilling to think that she hadn't yet actually *asked* for humanity to be brought back yet. She did have some symptoms of growing older, and someday she might drop dead of an aneurysm or something, and there's the last chance gone for everybody that ever was. Even if *she* didn't much believe it's a chance, shouldn't she at least *try* it? Think of all the people who are dead forever, and just maybe her mere asking could bring them back.

Sometimes, now she could never bring herself to say it out loud but she thought it . . . sometimes she thought she just didn't want to bring anybody back. Did she really want any of them? Had they ever been at all important to her? Had she once been better off or more contented in the old human days?

On the other hand, she supposed she'd be very important to them, a sort of goddess at least, if she could have them all brought back . . . *if* they ever believed what she told them, that it was her that brought them back. She imagined all sorts of people would be quick to claim all kinds of things once they were brought back.

Finally, on the eve of a rare day of rolling thunder and rain, she looked out at the last fugitive wisps of sun through angry clouds, the first she'd seen of its light all day, and thought she had the answer. She dreaded using the dream channel again, but she would have to. She hoped it would be the last time.

She spent the evening thinking over the good and just and decent things men had (sometimes) done. She poured into a common pool her ideal portraits of Jesus and Buddha and Thomas Assisi and Florence Nightingale and little dutch boys at dikes and men in newspaper writeups who die saving children from burning buildings and her cousin Martha who broke an elbow getting a kitten out of a well. She wished she could add something of her own, but she well knew that she had never lived for anybody or died for anybody but herself. Maybe now she could make up for that. Alone on the wet earth, naked to the chill breeze, no human eye to see, she slept her question.

"I challenge you, Roanei. These are things men have done. Are you worse than man was? Can you do less for man than man, at his best, could do for his fellow man?"

She learned the answer.

It was early enough in the history of the cosmos that the galaxies were not far strewn as yet, and blazed in the sky as thick as stars.

She dreamt the ancient story of the Toomeer, or so the Roanei termed them. They were already of age when the Roanei were young, and they guided the Roanei and taught and aided and nurtured them, as they did

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so many of the races that first came into being on the earlier worlds of the earliest suns. They gave unstintingly of their time and their energy and their sustenance, and yet never seemed to call guilt into existence, as if they were rewarded simply by being permitted to give.

And the Roanei, young and precipitous race, found itself abruptly on the rim of annihilation, despite their unique talent of resurrection, or rather because of it. For the races of a galaxy rose against the arrogance and the parsimony of the Roanei in the use of their gift, and descended upon them to erase them totally.

And at the point of doom, unexpectedly, the Toomeer were there, interposing themselves between the furious attackers and the fleeing Roanei. This race is young and foolish, said the Toomeer, but let it live. We should all be for life together, not death. If you must slay, we are here . . . slay us.

And the attacking races did. In their fury and hate for the Roanei, they destroyed the intervening Toomeer to the last member of the species. But by the time the path to the Roanei lay clear again, the bloodlust had died, and they were aghast at what they had done, and at the virtue of the race they had destroyed. And they slunk back to their various home-worlds and what became of them is instructive, but not part of the dream in question.

But the Roanei followed their customary procedure. They resurrected one of the Toomeer, and told him he could request *the resurrection of his species if he chose. Perhaps he never asked; certainly the Roanei never acted. They did not understand why the Toomeer had behaved in that suicidal manner, but presumably they had their own satisfactions in so doing. So the Roanei reasoned. The values of the Toomeer were as meaningless to them as those of the Mnestepoi or the Coronolee or Man. Of gratitude, they showed not a trace. The Toomeer have been extinct for many billion years.*

The next day was a mental seething. She sat or paced for hours, gnashing, weeping, boiling over. Those Toomeer were teachers and parents and *friends* to the Roanei, and if they were allowed to rot forever, after they had died for the Roanei, she figured she wasn't going to get far with an appeal to altruism.

In fact, she figured she'd give up.

No, wait. She could still *ask* them anyway.

Who was she trying to kid? The Roanei weren't just giving out life for the asking, that was clear. And she had never forgotten that she could ask only once; she kept remembering the sausages on the nose. She'd better hold off on that ultimate request a little longer. Once she'd pulled that, there'd be nothing left.

That night, still with fury smouldering in her breast, and an icier determination than she'd ever known in either of her lives, she stood a while, sniffing

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the scents she had come to know, feeling the rough bark of the trees, tasting fear and anger in the back of her throat. She did not know the answer, but she would find out. She lay down. Sleep was long in coming as she worried her question into place.

"Show me those races who *have* been granted rebirth. Why were *they* resurrected?"

It was a sleep profoundly empty of dream.

The dreamlessness had the authoritative aura of the dreams. She knew that itself was the answer.

There were no such cases. There never had been one.

She was somewhat hindered in the comments she wished to make to the Roanei by a lack of adequate knowledge of their progenitive processes or their personal antipathies. But she requested them quite strongly to be so kind as to attempt to reproduce themselves in liaison with that lifeform most unbearably repugnant to them.

She would be damned if she'd give such moral monsters the satisfaction of seeing her cringe. She'd been long taken for a sucker, but that was over. Now she'd just have to forget it.

She was sorry for the rest of mankind, but now she knew that nothing she could have done would have brought them back anway.

Sadists!!!

Years passed over her head, long in the passing, short in looking back on them. She was getting old.

At times the thought flirted with her mind . . . should she not at least try? There is always a first time, people used to say, and perhaps the Roanei might make their first exception in favor of man.

She wouldn't care to bet on that, though.

She had traveled long, and then settled long, developed a spot that was particularly hers in a world that was all hers in general, showed elderly crotchets to her line of squirabbits, forgot at times who and where she was.

A night came at last when, sitting on the shore of her own peculiar lake, she was in terror of death.

It had almost had her that day and was still waiting, invisibly final, in the shadows. She could no longer promise herself the whole night.

She felt she saw herself as she truly was—a lonely, selfish old woman. She never had cared for her fellow men. They could not have had a more indifferent advocate than herself.

She would not live forever. She felt an aura that told her she would not live out the next sleep. Let her at least go knowing she had done what she could. Let her pray for man to the Roanei.

The stars wheeled overhead. She could not do it. She *could not*! She was terrified to sleep without, and yet she could not. All her life, both her lives, spun about her, and all the other lives waiting for her to speak out for them, and she could not. What kind of

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abominable thing, then, she thought, must I be?

The east paled, she supposed it was the east, though it was only its paling that had ever told her so, and soon the sun would rise again. She could stay awake no longer, but at last she had brought her soul to a balance she could live or die with.

Lying on the shore of the lake, she wearily closed her eyes.

She did not think the Roanei ever granted wishes.

But if she could get only one wish, she would wish big.

She would wish alive something the universe needed badly, something the Roanei could not comprehend. She would wish for humanity; but not for Man.

She thought, her withered cheeks wet with her last tears, "Roanei, I wish for the rebirth of the Toomeer, they who gave themselves to death that you yourselves might live."

For the last time she moved in the landscapes of responsive dream, where human symbols clothed alien reply.

Wearily she struggled across the floor of the barren valley. The hummocks were strewn with countless bones, and they were white, and they were very dry. At a turning in the path she came across a dwarf. It squatted among the bones and stared up at her.

"Good evening," the dwarf said quietly.

"Good evening."

"You are quite certain of your wish?" it asked. "This is forever, you know. You wish for the rebirth of a race you do not know, rather than your own?"

She nodded mutely.

The dwarf's face puckered oddly. "This is very hard to understand. Did you hate your own kind so?"

"I didn't hate," she said, "but I never learned to love. I didn't have the Toomeer to teach me," she added with a touch of bitterness.

"Do you hate us, *then?" asked the dwarf.*

"I am trying not to hate anything for a few minutes more, and then it won't matter," she said.

The dwarf looked down at its gnarled palms, spat into them and wiped them on its thighs.

"The universe is full of creatures," it said slowly, "and all live their separate lives and crave their varied wants and hold their distinct values, and little do we comprehend or sympathize with any of them. One thing we find always and everywhere. When an individual is brought back to brief existence, and permitted to request racial rebirth, it invariably wishes the return of its own species. Each being appreciates the existence of its own kind, shares their particular values. We never grant such requests. We are rather . . . amused."

It looked at her, its eyes almost pleading. "But you . . . you have shamed us."

It was silent awhile, rocking back

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and forth on its haunches, considering.

"If you ask for rebirth," it said at last, "not for your own kind, but for another, we can only assume that, however little we can appreciate the reasons for such requests, there is something in that other race of higher and more universal value than the contingent preference of a single species. We feel we must grant such a request. For what is higher, should be."

The dwarf tightened its lips. "We

BIOLOG

by Jay Kay Klein

Until recently, almost all science fiction has been turned out by persons self-taught in writing. For some years now, universities have been giving courses in the writing of science fiction. Theodore Andrus Reynolds is a new writer of the old school, and one who has even taught the subject at the University of Michigan.

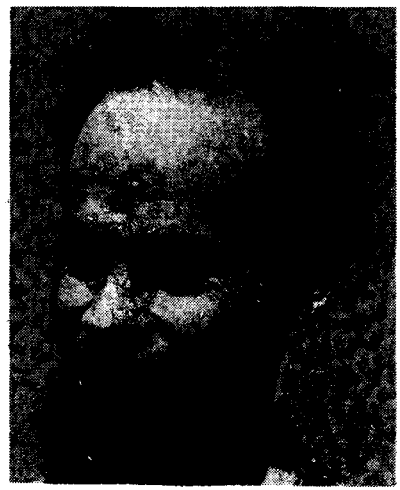
Ted has also followed the hallowed tradition of authordom by working at such jobs as copy boy, egg candler, planetarium operator, university instructor, accountant, translator, and others too assorted to remember, except for being one of the crew for six years on a circumnavigating ketch, the Phoenix. *As you may suppose, he has travelled through nearly all the seas and continents.*

Born in Madison, Wisconsin, and now living in Ann Arbor, Michigan, Ted was raised in Ohio and Japan. His first story was mercifully unpublished, with the title "Tex Rawhide of the T-Bar-R." At thirteen, his first published story appeared in a fantasy magazine. Two short stories sold the next year, followed by a rejection slip and two decades of knocking around the world before trying again.

"A half-dozen sales and suddenly you're in Analog. *They're doing a 'Biolog' on you, like they just did on Frank Herbert," Ted marvels.*

Some people think clothes make the man, others that you are what you eat. With Ted, it's the writing that counts. He says, "I find so much of fascination in words, in ideas, in people, in the universe, that being a writer seems to be the only job that makes sense (well, perhaps teaching). I see things, feel things, love things, I want to share with my kind of people. And so many of my kind of people seem to read SF."

You can meet the real Ted in this issue. He says, "In 'Can These Bones Live' I've put a whole slug of myself, and did it much the way I wanted to."



Ted Reynolds

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can restore life when we choose. But the cost to us is high. High not in your concepts of money, or time, or energy, but in terms you could not grasp, though to us they are of highest importance. But somehow at this moment, although we feel the costs, we shall ignore them. Your request is granted, then. The race of the Toomeer shall live again, as they did when we were young."

She bowed her head. "Thank you," she said softly.

And the heavens darkened with a crash as a sheet of lightning caromed from end to end of the heavens above them, and out of the darkness and the lightning a voice spoke in rolling thunder.

"WE HAVE NO WISH NOR NEED TO RETURN", boomed out the voice, awesome beyond belief and yet more human than she had ever heard from the lips of men. "FOR CYCLES WE HAVE BEEN CONTENT TO REMAIN FAR BEYOND YOUR VIEW. EVER SINCE THE EVENT YOU PRESUMED OUR ANNIHILATION. WE FOUND THAT THE VALUES WE HAD HELD FOR THEIR OWN SAKE WERE NOT AS EPHEMERAL AS WE HAD FEARED, FOR THEY ARE CHERISHED IN A REALITY YOU HAVE NOT YET GLIMPSED. WE OURSELVES WERE SURPRISED."

The thunder softened to an organ richness.

"WE HAVE LONG WISHED YOU TO JOIN US, ROANEI, BUT UNTIL YOU RECOGNIZED THE NEED, WE COULD NEITHER REACH NOR INSTRUCT YOU. WHAT YOU HAVE THIS DAY FOUND LACKING WITHIN YOU, WE CAN TEACH YOU TO POSSESS. WE CALL YOU TO US. WILL YOU COME?"

As the dwarf nodded, tears funneled the gnomish face.

"AND BRING BACK THIS RACE," continued the words on the wind. "WE ARE GRATEFUL TO IT. GIVE IT YOUR POWERS AS WELL. PERHAPS THEY MAY DO SOMEWHAT WITH THEM."

The dwarf stared into the sky. "Will they do better than we? They were a race riddled with weakness and folly beyond imagining."

"THAT IS TRUE. AND WITH STRENGTH AND UNDERSTANDING. PERHAPS MAN WILL BECOME THE LATTER-DAY ROANEI OR MNESTEPOI. BUT PERHAPS IT WILL BE A NEW CORONOLEE OR TOOMEER. THE RACE HAS THE SEED, THE POTENTIAL FOR ALL THINGS. THE UNIVERSE IS A TESTING GROUND, AND WE MUST NOT PREJUDGE WHAT THEY MAY BECOME.

"BUT FOR YOU, ROANEI, WE HAVE BEEN LONG WAITING. COME, CHILDREN."

There was a long silence. Through the air a shaft of brighter sunlight struck down and bathed the dwarf. Finally he sighed deeply, rose to his feet, stretched his arms towards the heavens. He stood there, winds whipping his hair, tears drying on his craggy face; and as she watched, his form dwindled, dissolved, was gone.

She stood alone on the bare plain, the bones scattered far about her, white and bare and dry, to the furthest horizon. As she watched, they began to stir.

"And he said unto me, Son of man, can these bones live? And I answered, O Lord God, thou knowest." ■

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TRUDY E. BELL and ILIL ARBEL

HAREM

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Ahmed ibn Fyodor Hamilton was bored. He leaned his forearms on the stone parapet of his balcony and watched the gardeners here and there below him tending the date palms and the lush multicolored exotica reaching to the horizon and beyond; the scraping of their hoes just faintly reached his ears. But this morning not even the sight of the most magnificent terraced gardens in the world could cheer him. He sighed.

A maidservant stepped onto the balcony with Ahmed's second breakfast of thick coffee and fresh fruit. She assisted Ahmed in lowering himself onto the brocaded cushion before the inlaid table, and she flicked a linen napkin open across his lap. After gathering up his dictated answers to the overnight mail, she slipped away.

Ahmed picked up one of the computer-printed newspapers lying next to his plate, but in a few moments he closed it with an unhappy shake—not even the latest UFO reports amused him. In the past he had been fascinated by the observation that UFO sightings seemed to recur about once every 15 years: first in the late 1940s, then in the early 1960s, then in the late 1970s, then around 1990, and last in the first decade of the 21st century. He had the finest library in the world covering the entire history of UFOs in all languages. But this morning the newspaper reports just seemed to be just another in a series of repetitions of the same old phenomenon.

Ahmed gazed up at the brilliant blue sky and inhaled the fresh air of an uncommonly balmy morning in the early Saudi Arabian spring. What should he do with the rest of the morning? Call for the lovely Eskimo that he had just acquired, for whom he had searched a year and a half to finally complete his harem? He extended his hand toward the intercom in the table, but it was just beyond his reach, and he left his arm lying listlessly next to the untouched fruit. Not even the thought of a forenoon's love could stir him.

As he sat in a miserable slump, he gradually became aware of commotion below. The birds had ceased their song and were twittering and flapping in alarm; the gardeners were crying out and abandoning their tools, scattering in all directions through the leafy maze. A humming whine throbbed the air, growing louder. Ahmed hoisted himself up from the breakfast table, knocking the newspapers to the flagstones, and he leaned over the parapet, vainly trying to plug his ears.

Whatever was happening was around to the front of his palace and out of sight. Grimacing against the ear-slicing whine, Ahmed punched the intercom's call button. Immediately the maidservant ran out onto the balcony, weeping and wringing her hands.

"What is it, child?" Ahmed demanded, shouting over the pulsing whine.

"Sayyed Hamilton! Sayyed Hamilton!" she gulped. "A—a *flying saucer* is circling the palace!"

"My dear, this is no time to play

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jokes. What the—" Just then the whine groaned into echoing silence. Ahmed tentatively uncovered his ears.

Footsteps hurried across the tapestried hall inside, preceded by a stream of curses. "Ach, du mein lieber Gott in Himmel—" Ahmed's personal secretary Hans Grieger panted onto the balcony. "Sayyed Hamilton, I don't know quite how to tell you this, but a flying saucer just landed on the heliport and this—this *creature* got out and—and says it wants to meet with you. Whatever shall we do?"

The bottoms of Ahmed's feet began to tingle. "Why, show our visitor in, of course."

Hans stared, mouth working.

"You," Ahmed addressed the maidservant, "see that a fine feast is prepared in honor of this visit. And remove those breakfast dishes. Hans, under no circumstances is anyone to disturb us until I call."

"But—but, Sayyed Hamilton!" protested Hans, finding his voice. "Your personal safety—What if this creature—"

Ahmed folded his arms. "Mein Herr Grieger, you seem to have forgotten both your duty as a secretary and my duty as an Arab host. We do *not* keep a guest waiting."

Pale, Hans bowed and exited.

Ahmed paced as he waited, adjusting his robes, combing his fingers through his beard, glancing around the hall to check that all the Persian rugs were straight. This was all beginning to shape up to be an interesting morning indeed.

The far door opened. Across the richly tapestried hall a tall figure entered with grace and purpose. The head was humanoid, although instead of hair the pate glistened with tiny scales. From the neck to the floor flowed a grey garb of what looked nothing so much as a grass skirt made of rubber. "Sayyet Akmet ibn Fyotor Hamilton?" the visitor inquired in hoarse, gutteral tones.

"At your service," Ahmed bowed. "And whom do I have the honor of entertaining?"

"I am Ampassator ———" followed by a string of harsh consonants that sounded like chattering teeth. "I am from ———" more consonants, "the secont planet of the star you call Epsilon Eritani."

"Please sit down," Ahmed bowed again, indicating gold embroidered pillows in the center of the hall.

The Ambassador sat, although under all the rubbery streamers it was impossible for Ahmed to determine how the leg joints bent, or if, indeed, the Ambassador had legs. "You are very kint, ant even more hospitable than I have any right to expect," the alien croaked. "Let me explain my pusiness. I am representing the Association of Sentient Civilizations, an economic cooperation or group of planets inhapited by sentient peings. It is not a governing agency, but it is an alliance chiefly to further interstellar trate of technology and commodities. The Association was formed only a very short time ago, only—" the Am-

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bassador hesitated as if doing rapid mental calculations, "—only forty-two of your years ago. So far it numpers only apout two tozen civilizations, all within several hundret light-years of here within this spiral arm. It was started py my civilization and one other more atvanced, but inclutes a numper of civilizations only apout the level of yours. We are currently examining the planets of stars in this neighporhoot for potential mempers to expant our system of interstellar trate. Ant now we woult like to discuss the possipility of your planet joining the Association."

"Dear me," muttered Ahmed, surreptitiously scratching his feet. "I don't know quite what to say. A thousand questions flood my mind."

"Ask," the Ambassador said simply.

"Well, for starters, how did you find out about Earth? What makes you think we're ready to join? And why, instead of going to the Shah or the President or the Premier or the Chairman, did you come to *me*?"

"I am answering your questions in orter. One of our scout ships fount out apout Earth when, in investigating this neighporhoot ten or twelve of your years ago, it fount a small space probe not too far from this solar system, heading away from it. The probe had an antenna on it a little broader than I am tall, with a plaque on it with pictures. We coultn't unterstant some of the pictures, but it was clear to us that the probe hat been built py intelligent life on this planet that was capable of interplanetary travel. We inferred that the pictures on it may have been put there so that any peings that fount the probe woult know where to return it. I have it with me, py the way. Woult you like me to have it brought in?"

"No, thank you very much," Ahmed demured. "I'll look at it later."

"As you wish," the Ambassador acknowledged. "When we fount the probe we knew from the pictures that the peings that made it hat at least thought of extraterrestrial life and hat thought of contacting it. That was highly interesting to us, as you know. So we placed a monitoring station of ours just outsite the orpit of the farthest planet. There we listened to your radio and television broadcasts to learn what we coult apout your civilization, to determine if you were suitable cantitates for mempership in the Association. That was where I came in. To pe Ampassator one must also be part anthropologist and part linguist."

"You speak Arabic extremely well," Ahmed replied admiringly.

"Tank you very much. You are too kint," the Ambassador responded. "Now, from your news broadcasts it was clear that the Shah and the Presitent and the Premier and the Chairman were the heads of various countries and that they are watched very closely by your public. But they are all equal to each other, and no one takes the leat in planetary affairs. It also became clear to me from the broad-

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casts that even though you have no political position, you are a very important person. Even more important, you understant economics. You own half the land mass in Sauti Arabia, Russia, China and Mexico; you have come to your position because while other countries fought over legal and environmental impacts of nuclear power, you quietly built eighty-three percent of the operating nuclear power generators in the worlt. Ant you sell the power so cheaply that no one else can hope to compete. Most people think you are a funny lovable Arap who is a compulsive collector. But in fact you are the single most powerful man in the worlt. Eventually most of the worlt leaders will probably do whatever you recomment."

Ahmed leaned back, his elbows sinking into his pillow. A slow smile tugged the corners of his mouth. "Ambassador, you are a shrewd observer, and you realize more than the President, the Premier, the Chairman, and probably also the Shah, all combined. I think I will enjoy doing business with you."

"You are too kint." The gravelly voice actually managed to sound modest. "In that case, perhaps I hat better tell you more apout the Association. But is this a convenient time? Shoult I go away and come pack again at a better time?"

"Ambassador, your timing was perfect," Ahmed said blissfully. "I would like nothing more than for you to be my guest all day. May I offer you something to eat?"

"No, tank you. Your amino acids are levo amino acids ant mine are dextro amino acids. We can breathe the same air, but we coult gain no nourishment from each other's food. Please satisfy yourself, however, and with your permission I will have my own meal brought in."

So Ahmed rang for the magnificent Arabic feast of many courses, and had a second inlaid table brought in for his guest, and the two spent swift, oblivious hours comparing their food, comparing their planets, comparing their civilizations, comparing their thoughts, and discussing the future of the heavens and of Earth.

Along about sunset Ahmed stretched his cramped knees and with difficulty gained his feet. "Would you like to take a stroll around my gardens?" he asked, offering the alien a hand up.

"I woult like that very much," the Ambassador replied, smoothing the streamers where they had wrinkled. "I woult also like very much to see your other collections, especially your harem, which seems to pe so famous. It is said that it is the finest that has ever existed, and that you have recently completed it. I am alive with curiosity, Sayyet Hamilton—what is a harem?"

Ahmed grinned. "Come with me." He led his guest through thick-walled corridors to a balcony that overlooked a spacious stone courtyard hung with leafy vines. The slanting rays of the sun touched the courtyard walls with orange. Below the balcony, unaware of the watchers, hundreds of graceful

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young women were reclining on large colorful cushions, enjoying their evening meal. Their attire ranged from saris to kimonos to casual slacks. The gentle clinking of their glasses and silver against china and their quiet conversation wafted to the watchers' ears.

"This is my harem," Ahmed said proudly. "One thousand and one women."

The alien was visibly startled. "Parton me, but I do not unterstant. I expected to see some kint of—of work of art."

"Oh, but it is. This harem is a collection of women from all over the world, one from each nationality and state from within that nationality. Do you realize how difficult it is, in this age of cultural homogeneity, to find representatives of 1,001 different cultures—all of whom are female, beautiful, and willing to live with me?"

The alien was silent, carefully watching the women relaxing and dining. At length the grating voice murmured: "So those are human females. What is their relationship to you?"

"They're my concubines—my mistresses. Understand 'mistress'?"

"So many for one man? Remarkable. No other civilization in the Association has such a phenomenon. Is it unusual?"

Ahmed laughed. "Believe me, on this planet promiscuity is considered no virtue. I am just rich and eccentric enough to get away with it. It's a lot of work, too: I see each woman only about once every two or three years. Don't really get to know any of them. Actually, I'm thinking of disbanding the harem now that it's complete."

The Ambassador said nothing as they strolled off the balcony and down two flights of stairs into the gardens. The fragrence of jasmine was beginning to fill the evening air. "You are a complex and interesting man, Sayyet Hamilton," the alien said at last.

Ahmed chuckled. "You disapprove."

"It is not the place of either an anthropologist or an ampassator to approve or disapprove of alien customs."

"A commendably tolerant point of view. The old Earth needs a good dose of tolerance." Ahmed sighed, reaching up and pulling down a vine of soft, white fragrant blossoms. "My private secretary has been warding off reporters all day. The whole world knows you're here. I think I'd better start working on our joining your Association."

"Excellent. Then we are agreet. Let's go back and solemize the agreement right away. I shoult return and let the Association know that our invitation is unter your consiteration."

"Fine." Ahmed led the way back up the stairs, puffing from the exertion. En route they passed the harem, and he noticed that the alien glanced sharply at the women as they walked by. On something of a hunch Ahmed asked mildly: "Tell me, Ambassador. You know that I am a man, What are you?"

"I am a ———" the alien's teeth

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chattered. "I am a woman."

"Ah-h," Ahmed nodded, faintly chagrined.

Once more in the tapestried hall the Ambassador turned. "What is your usual agreement ceremony?"

"Well, for informal agreements humans usually shake hands. For more important ones, such as matters of state, we usually draw up papers with the terms of agreement and sign them."

"Papers for *important* agreements?"

"Yes."

"Remarkable."

"Why is that?"

"Is not the reason for writing the terms so that if one party violates them the other can exact retribution?"

"Well-I, I suppose that's part of it."

"How odd to act on the expectation of distrust in the exact situation when trust is most needed." The Ambassador twitched her streamered garb.

"Why, how do you in the Association solemnize important agreements?"

"In the most important cases the parties symbollically express their mutual vulnerapility and trust by disrobing and joining in the most vulneraple and trusting way known."

For the first time that day Ahmed was frankly taken aback. "You mean—between different *species*!?"

The alien remained silent. It was a rather stony silence, too, Ahmed thought anxiously. "What is the difference?" she asked. "All of us in the Association are sentient. All of us are human—insaneyyoun, menschlich, chelovecheskee, jen-loi, lkttcht'kk."

"Please don't misunderstand me," Ahmed covered hastily, palms damp. "I was only marveling at the —um— hydrodynamic complexities."

"Where there's a will," the Ambassador said stiffly, "there's a way."

Ahmed stood in the middle of the loveliest collection of Persian rugs in the world, gazing at the irridescent-scaled Ambassador from the second planet of Epsilon Eridani. The soles of his feet began to tingle. Slowly he lifted his right arm and gently drew his finger across her cheek.

The shadowy evening desert breeze stirred Ahmed's robes as he stood in the darkness next to the Ambassador on the terrace, gazing up at the star-filled heavens. "There's the constellation Eridanus snaking around the sky there in the south west. Epsilon Eridani is that relatively faint star there about a quarter of the way up from the horizon, not too far from the thin crescent moon."

"So beautiful," the Ambassador murmured. "No matter how many alien worlts I visit, I never tire of seeing the stars from an unfamiliar point of view. Our interstellar travel is so quick—only a few weeks to cross the nearly eleven light-years from my planet to yours. You have no sense of distance in the universe."

Ahmed chuckled softly, but it was a sad sound. "Unfortunately, I have

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only too vast a sense of it. I would give almost anything I own to, just once, see another planet for myself. But aside from exploring and prospecting expeditions, human beings haven't really ventured off this planet. Payload space is still at a premium, reserved for tools and strong, lusty young miners. I am fifty-eight years old and weigh ninety-eight kilos. I've lived only half my expected life, and all things considered, I'm in pretty good shape. Even so, no sane prospector is going to be convinced to leave off some important piece of machinery in favor of a lazy, hedonistic Arab who simply wants to take a joyride."

"Not even with all your riches?"

"My friend, there are some things no amount of money can buy. What prospector is going to risk waking up every day worrying if I'm going to have a heart attack or fall down a loading chute? And if I died on him, God forbid, he'd be embroiled in such a scandal his children wouldn't outlive it. There are disadvantages in being too rich and famous." Ahmed shook his head. "No chance."

The Ambassador turned back to stargazing.

Ahmed's thoughts began to drift and he was almost startled when the alien's rough voice spoke again. "Sayyet Hamilton, when a planet is accepted into the Association, a telegate is sent to the Association headquarters on my worlt. Now, the Earth has not yet been accepted, but I wonter if we coult not make this a special case and appoint you probationary telegate. In that case, if you wish, you can return with me to the Association headquarters. Actually, that might even expedite matters, because the Council of the Association could interview you directly instead of going through me."

Ahmed inhaled deeply, his mind suddenly shifting into overdrive. His spirit leaped with wild hope. His heart began to race. "Ah-h," he almost moaned. "Ambassador, give me a moment to think." She stepped away, leaving him on the terrace alone with the night.

Ahmed leaned against the parapet, yearning starward, half-consciously opening and closing his grip on the rough stones. He hungered to see what riches and enterprises the universe held for an adventurous businessman—riches and enterprises that only the Association could offer. Yet if he left for more than a month or two, his business affairs on the Earth might begin to founder. Management of the nuclear power plants especially needed close control. To minimize problems with his employees, he had purposely chosen people like Hans Grieger to be their overseers: faithful, adamant people who carried out his instructions to the letter against most odds, but who were so uncertain of their own authority that they were grateful for his close supervision. If I were to leave, Ahmed mused with concern, the plants might begin to suffer internal problems. In a worst-case situation some might even have to shut down. Now, if that happened, it could create a short-term

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energy crisis, in which case the President et al. would be forced— Suddenly a crooked smile dawned on his face and his feet began to tingle. He struck the parapet with his fist and began to laugh. Blowing a kiss to the Milky Way, he turned and strode into the tapestried hall with a jaunty step.

"Ambassador, how long do you think such a trip would last?"

"You are coming? Excellent." The alien paused. "The trip woult last—approximately four of your months, I woult guess. Maybe five. Better count on five."

Ahmed grimaced for an instant. That's a lot of food, he thought. Ah, well, how often does a chance like this come along. "Let me start my servants getting my clothes and things ready to go." He moved aside the fringe of one Persian rug and pressed a button on the wall beneath. "Oh, while they're packing, wouldn't you like something for yourself to take back? It's often a custom here for a host to present a guest with gifts. Wouldn't you like a souvenir of your visit to Earth?"

"I am already taking back the best souvenir from Earth that I coult," the Ambassador replied. "You."

Ahmed began to protest, but was interrupted by his maidservant running into the hall. She stopped short and quivered at the sight of the alien, but Ahmed gave her concise instructions and sent her away.

The door had hardly closed behind her when it flew open again and Hans Grieger rushed in, pale and dishevelled, arms laden with newspapers. "Sayyed Hamilton, Gott in Himmel, those reporters are *wild*—I doubt I can keep them at bay much longer. You've been closeted with this—this—for fully ten and a half hours now, and the entire world is in a panic to know what's going on. Just look!" He heaved the newspapers out of his arms and wiped the smell of the slick computer paper onto his pants. The edges of the papers were crumpled and wet where he had held them with his sweating hands. He nudged the papers apart with a shaking foot so that the headlines leapt up and hit Ahmed's eyes. Tears in his voice he exclaimed: "Sayyed Hamilton, much longer and I fear those newsmen are going to storm the palace."

Ahmed regarded him coldly. "Mein Herr Grieger. I believe that I asked not to be disturbed. Tell the reporters I'll have a statement for them in my own good time. Tell them the alien's intentions are entirely friendly—that this visit is the best thing that has ever happened to planet Earth. You may further tell them that if they cannot exercise simple courtesy and self-control, that I will see that each and every one of them is fired."

Not trusting his voice, Hans glanced from Ahmed to the Ambassador, nodded shortly and left.

"I am grieved to have caused so much commotion," the alien said, "but what else coult be done? Radio signals traveling at just the speed of light are simply too slow—it woult take half the age of the Association simply to sent a message from my

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planet to yours and to get an answer back."

Ahmed shrugged. "What's done is done. Besides, I've found that the short, punchy, dramatic approach is often the most effective way to get something done: while everyone else is left lying confused in the dust you just do what's necessary, and by the time they come to their senses everything's accomplished.

"Still, I remember how tistressed we were when the ————" consonants stuttered out, "first contacted us by lanting on my planet sixty of your years ago."

Ahmed, a professional judge of women, could not help the random thought, Sixty, eh? He brushed it away. "Listen, in half an hour or so I intend that we shall break the news of the Association to that mob of frenzied reporters. You should say a few words about the Association and that you came to invite the Earth to join, and I'll announce I'm returning with you to personally inspect the situation. Then my people will load the supplies on board your, uh, spaceship, and we'll take off before anyone can think of some way to stop us."

"What about the space probe of yours I have?"

Ahmed snapped his fingers. "Come with me." He padded across the hall through an archway into an adjoining room just as large, but lined floor to ceiling with glass-enclosed book cases. "This is my library," he explained to the alien. "Those two walls and that one freestanding case over there contain the most complete library in the world on unidentified flying objects."

"So these are human books," the Ambassador murmured raspily, gazing about in wonder.

"Getting harder to come by, too, what with videocassettes taking over things nowadays," Ahmed replied, scanning the shelves. "Let's see, now, space travel, space law, spacecraft—here we are." He unlatched one of the glass cases and slid the door aside; from a shelf at shoulder level he pulled out one volume. "About a dozen space probes have been sent on missions that took them out of the solar system in the past four or five decades, all bearing plaques or some other message to possible extraterrestrial life. Somewhere in here are pictures of all the probes—at least I thought there were—" he flipped the pages back and forth. "Ah, here they are. Now, could you pick out the probe you have?"

The Ambassador gently relieved Ahmed of the book, fingering the surface of the paper with her four-digit hand. Slowly she turned the pages and examined the illustrations. "There. That is the one."

Ahmed glanced at the photograph. "Thought as much. Takes so long for probes to get out of the solar system that the early ones are the only ones that have had half a chance. We sent out two like that. Do you remember where the scout ship found it? That would tell me which one you have."

The Ambassador carefully closed the book. "No, I am sorry. But I coult—"

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"It's not that important." Ahmed slid the case closed and latched it again. In the reflection from the glass he checked his beard, adjusted his robe, then turned to the alien and grinned, rubbing his hands. "Well! Shall we leave?"

They hastened to the front of his palace, en route passing Ahmed's newsroom. From the continuous clacketyclackety of the computer printers Ahmed could tell that the news services were doing overtime tonight. As they neared the front entrance hall of the palace, a muffled growling reached their ears. At Ahmed's nod the four guards there unbolted the doors and swung them wide. Ahmed and the Ambassador stepped out onto the veranda.

For an instant's impression, the night was pushed back by harsh bluish-white lamps on the tops of vans; a jostling ocean of human faces and black boxes flooded the curving driveway and the heliport beyond, except where it was cordoned off a safe distance from a large glistening cube; even in the open air the acrid odor of human adrenalin permeated the air.

But in that instant the growling of the crowd escalated into a roar and

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Ahmed was blinded by an explosion of flashing strobes. As he moved forward to the cluster of waiting microphones, he stumbled over heavy electrical wires snaked across the porch. Instantly the Ambassador caught his elbow and steadied his steps.

Ahmed raised his arms. The brilliant flashes continued, but the roar diminished into whirring, clicking silence as scores of recording devices were switched into operation.

"Ladies and gentlemen," Ahmed's voice echoed across the crowd, "for at least four hundred years human beings have wondered whether intelligent life exists on other planets. More than forty years ago our grandfathers and grandmothers launched two spacecraft called *Pioneer 10* and *Pioneer 11* past Jupiter and out of the solar system—the first Earth-built objects ever to leave the solar system. On each of the spacecraft was an engraved plaque of gold-anodized aluminum, a greeting card from *Homo sapiens* to Occupant, Universe. A slim chance indeed that anyone would find it, it was thought, but at least some permanent evidence of our having passed this way was drifting through the universe.

"In the 1980s a search was begun for extraterrestrial radio signals from nearby sunlike stars. The searches lasted for more than a decade and were uniformly unsuccessful. We began to wonder if indeed we were celestial freaks, a cruel joke of chemical chance, desolate and alone in vast eternal space.

"Well, my friends, the longest shot was the one that paid off. This morning Occupant answered our greeting. It gives me pleasure beyond all words to present to you now Her Excellency, the Ambassador from the second planet of Epsilon Eridani."

The roar rose, the crowd surged, the onslaught of flashes became a brilliant pulsing wall of pain. Ahmed squeezed his eyes shut, and was still faintly nauseated by the incessant flickering through his eyelids.

The alien, apparently unaffected, stepped forward to the microphones. "Citizens of the planet Earth, as Ampassator from————" static over the loudspeakers, "I greet you, and I pring you our warmest hopes that we may be frients. As a token of our goot will, I have returned to you the *Pioneer* probe that a scout ship of ours fount near your solar system not too long ago."

She fell silent, gazing across the crowd to her ship. The crowd, uncertain, followed her gaze. To Ahmed's own astonishment, the *Pioneer* spacecraft had appeared on the ground next to the cube, the curve of its radio antenna visible above the heads of the crowd.

The Ambassador spoke again. "I am come as a representative of the Association of Sentient Civilizations, an economic cooperative to promote interstellar trate, to which we have invited the Earth to belong. Your esteemed representative Al Sayyet Akmet ibn Fyotor Hamilton will tell you more. I deeply hope that you will discuss this

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among yourselves and will decite to join with us in peace and prosperity. Tank you very much for this opportunity to speak to you."

Ahmed read into the microphone the notes he had jotted down about the purpose of the Association and the economic and technological benefits of memberships in it for the Earth. At the end he looked up. "My friends, I will not take any questions now because I do not know the answers. However, I am leaving at once with the Ambassador in hopes of learning some of the answers, which I will give to you as soon as I return. Thank you." He bowed.

The roar, if possible, ascended until it became even more deafening, mainly consisting of urgent calls of their names. "Ambassador, I can't see because of all those damned strobes," Ahmed muttered as he straightened up. "Would you do me the kindness of leading me back the way we came?"

With a light touch on his elbow the Ambassador guided him back into the front hall. Once the guards closed the doors, Ahmed thankfully steadied his shoulder against a wall and massaged his temples, green and purple spots drifting in front of his eyes. "My aching head—didn't the camera flashes bother you?"

"I coult see them rather dimly, but the wavelength of their light must be in what you call the plue region of the spectrum. My sun is oranger than yours, and the peak wavelengths of my vision is shifted toward the red with respect to yours. This room, for example, is much brighter than those flashes."

Ahmed glanced around the entrance hall, softly illuminated by warm indirect lighting. "Well, I guess I can see well enough now to navigate. Quite a horde out there, isn't there? We'll never be able to push our way through that mass of humanity to your space ship." He tapped a thumbnail against his teeth. "We'll have to use the freight loading tunnel that leads into the wine cellar. Your ship is about in the middle of the heliport. Let's just hope it's near where the tunnel comes up."

He pushed three buttons on the intercom in the wall and two servants rapidly appeared. "Please see that the supplies for my trip are transferred into the loading tunnel under the heliport." They left.

A good three or four minutes later a tardy Hans Grieger hurried in. "Forgive me," he caught his breath, "but the moment you stopped speaking the telephones started ringing. Half the overseers are on hold, already the Shah and the President have called, and when you summoned me I was talking to an undersecretary of the Premier. You're not really going through with this, are you?"

Ahmed seemed surprised. "I most certainly am. Moreover, you are to be in charge of things while I'm gone."

Hans looked striken, words failing in his mouth.

Relenting for a moment, Ahmed squeezed his damp shoulder. "Relax, Hans. Just do everything that you

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usually do, in the excellent way that you usually do it, and only think about one day at a time. Everything is going to be all right. God be with you."

Ahmed led the Ambassador down through the best private collection of wines in the world, into the loading tunnel. There he halted, aghast.

The wide conveyor belt in the tunnel was empty.

Next to it a small group of empty-handed manservants regarded Ahmed with bewildered apprehension. Fury mounting, Ahmed advanced up to them. "*Where are those boxes of supplies*?"

"They're already aboart," the Ambassador replied.

Ahmed glanced at her sharply. To his servants he nodded curtly. "You may go." They hastened past him, single file.

Ahmed and the Ambassador climbed the stairs beside the conveyor belt that exited at the heliport. As Ahmed pushed up the loading door, the clamor of the crowd engulfed them. They emerged almost underneath the *Pioneer* spacecraft. As soon as Ahmed stepped forth, an octagon in the side of the glistening cube before him dilated, and red-orange light streamed forth.

"There they are!" a voice cried.

Yelling. Shoving. Flashbulbs. Only the cordon kept back the human crush as every journalist and photographer grappled for a good shot. Tension almost ionized the air. A rare spurt of fear laced Ahmed's bloodstream as he lowered the tunnel door flush with the pavement and followed the Ambassador into the alien craft.

"Lie down here," the Ambassador directed Ahmed to a depression in the floor. With difficulty he gathered up his robes and lay down, surprised when the surface that supported him began to fill with a liquid, and straps automatically linked across his chest. The Ambassador meanwhile lay down in a depression next to his.

In moments the walls of the alien craft went transparent, revealing a full but soundless view of the night-lit palace, the straining crowd. As he watched the crowd clapped their hands over ears and fell back, faces contorted. The palace dropped away and Ahmed's body was pressed deep into his cushion; around him all he could see was night. He closed his eyes as his weight continued to increase, and concentrated on simply continuing to breathe.

After what seemed like an interminable time, his weight diminished to approximately normal and the straps automatically retracted.

"Woult you like to get up and look arount?" the Ambassador asked, standing up herself and offering him a hand. "Our acceleration now is a bit more than one of your gravities. We shoult be near your ninth planet in eight or nine of your tays."

Chest heaving, with difficulty Ahmed gained his feet. As soon as he was upright, a panel slid silently over the depression, making a seamless floor. He raised his eyes—and gasped.

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Below him yawned all the vastness of star-flung space; suspended in the middle was the big, beautiful sun-brilliant blue-and-white globe of Earth.

Ahmed's breath grew shallow; the brilliant image blurred. An inexplicable loneliness engulfed him—the same emotion that had moved him once decades before, when he had witnessed a total eclipse of the sun.

He was in space.

The journey between the stars faster than light took scarcely twice as long as the journey from the Earth to the large interstellar ship at the edge of the solar system. As soon as they came within reasonable light-travel distance of Epsilon Eridani, the Ambassador radioed the Council of the Association of their impending arrival. At the edge of her planetary system she, Ahmed, and his goods were transferred from the interstellar ship back into the smaller vehicle that had conveyed them from Earth, and for another half week they coasted to the second planet of Epsilon Eridani.

As they passed through the vast glinting belt of interplanetary debris that ringed the edge of the small Eridanian solar system and neared the noticeably oranger star, Ahmed thought about their journey. The fact that the intersteller ships traveled faster between the stars than messages sent by electromagnetic waves suggested to him that a canny businessman might do very nicely for himself by setting up an interstellar courier service to regularly carry communications between the stars, thus eliminating the need for heads of state such as the Ambassador to physically transport all messages themselves. At an appropriate moment Ahmed put a few casual questions to the Ambassador, then jotted a few notes and filed the idea away in his entrepreneurial mental reserves.

The moment they touched down on the Ambassador's home planet, everything was new and fascinating. The first thing that Ahmed noticed when he stepped from the alien craft was the wind—wind that tangled his robes and fairly whipped the air from his lungs. The windy air was cooler than the Earth's, and was noticeably thinner and less rich in oxygen, making Ahmed even shorter of breath than usual. The effect was only partially offset by the weaker gravitational field.

Ahmed paused a moment and swept his wind-watering eyes over the spaceport and beyond. The spaceport itself seemed very much like the airports and space centers on Earth—acres of flat buff-colored pavement dotted with a few low buildings. Beyond the spaceport the distant trees seemed short and spindly with deep green foliage. The horizon seemed oddly close.

"Sayyet Hamilton?" The Ambassador touched his elbow.

Ahmed sighed in ecstasy of new sensation. "Coming." Holding his arms down at his sides to minimize the whipping of his robes, he followed her to a waiting chauffered vehicle that

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was built very low to the ground. The sides of it were so low he could not determine if it had wheels or treads or what. Its engine emitted a low quiet hum.

As they sped across the spaceport, Ahmed noticed that they were nearing a vast crowd at the spaceport's edge. The vehicle slowed and stopped, and the Ambassador assisted Ahmed out and up the stairs of an outdoor platform. From that gusty height Ahmed estimated that at least a quarter of a million individuals had turned out to welcome him. He was delighted to notice that the entire irridescent-scaled populace before him wore the same peculiar streamered garb—even the occasional children.

Unfazed by the buffeting gale, the Ambassador began to address the crowd in her own impossible language. Then, with the Ambassador translating, Ahmed was interviewed at length by Eridanian reporters and several dignitaries—an interview that was ignominiously terminated by something very painful blowing into Ahmed's left eye. The Ambassador quickly brought the ceremony to a close, and to waves of rousing tchicking (which Ahmed hoped was the equivalent of applause) she then led Ahmed back to the waiting vehicle.

"Sayyet Hamilton, I *must* apologize. It shoult have occurt to me—" the Ambassador began as the vehicle started up, speaking with more agitation than Ahmed had ever seen.

"Think nothing of it," he interposed, expertly pulling down the lid of

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his streaming eye. "In a desert country like Saudi Arabia I'm always getting sand in my eyes." But it was with acute relief that seconds later he felt the particle dislodge itself and wash away. "Ah, there." He daubed his eye and focused on the Ambassador's anxious face. "It's nothing, it's gone now. Believe me! Please, now, tell me what we are seeing now on your wonderful planet."

They were gliding through narrow curving city streets before low buff-colored buildings constructed of the native stone. "This is our capital city of ————" a stream of consonants, "which is fairly typical of our cities. Most of them are rather small by your stantarts, having perhaps a million intivituals at most. Most of them are built where olt towns first grew up thousants of your years ago, so they are a mellow mixture of olt and new. They have remained small principally because of limitations to the size of the wall."

"The wall?" Ahmed asked.

"Yes, see that wall we are nearing now, far to our right?"

Ahmed peered over the tops of the passing buildings and beheld a buff-colored, free-standing stone wall of very ancient appearance that had to be no less than 50 stories high. The upper half of it seemed to be riddled with tiny windows. It was by far the most imposing structure in the city—a single, thick stone wall dominating the city's one edge. "*One* wall?" Ahmed blinked. "What kind of defense is that?"

"A defense against the prevailing wint," the Ambassador replied. "All our cities are in the lee of such walls, which break the force of the wint. The holes in the top part of the wall minimize wint stress and air turbulence. The wint is also why the streets are so crooket—so that there is no long straight passage to built up a howling gale."

The vehicle slowed to a stop before an array of buildings constructed right against the base of the wall in a neighborhood that was clearly an excellent section of town. The Ambassador assisted Ahmed into the startlingly calm street. "The closer to the wall, the finer the neighporhoot," she said. "If it's ever winty here, you *know* it is winty outsite. This is the Council's headquarters. You will be staying in one of our finest suites for oxygen-breathing delegates."

The Ambassador led him through a high-arched stone lobby, and up a short sloping corridor to a wide door of some green, deep grained wood. At the door she expertly flipped a complex latch, then repeated it for Ahmed's benefit. The wooden door swung open—a common swinging door!—and the Ambassador stepped inside. As soon as she crossed the threshold, yellow light from the ceiling flooded the generous apartment. In the main room was a thick amber carpet, furniture curved for alien bodies—and Ahmed's boxes of supplies.

The Ambassador crossed the room and opened the door of the sleeping chamber, where the "bed" consisted

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of a wide, soft depression in the floor. So that's where they got the idea for their acceleration couches, Ahmed observed. Next the Ambassador showed him the large bath chamber and matter-of-factly described the use of several of the various knobs, spigots and receptacles. (The assortment of pipes and basins she didn't explain, though, were the ones that intrigued Ahmed the most.)

After asking Ahmed whether there was anything he might need, the Ambassador prepared to depart. "This evening the Council of the Association is holting a gala reception in your honor," she informed him as she opened the door. "I will come py for you in four hours of your time."

Ahmed bowed. She acknowledged it and closed the door behind her.

Left alone, Ahmed kicked off his sandals and explored a bit, enjoying the deep pile of the carpet between his toes. He tested the furniture in the sitting room, examined the fixtures in the bath chamber, and ran his finger over the durable front-surface full-length mirror. Eventually he discovered a door from the sitting room outside onto a small, partly enclosed patio just a meter or two above the street. Well, that says something about their culture here, he thought as he leaned against the balustrade and surveyed the stone buildings of the quiet residential street. Never on Earth would a delegate's life be trusted in a ground-floor apartment.

After fitfully resting for an hour or two in the alien bed, Ahmed bathed and dressed for the reception—and from that moment, when the Ambassador came to escort him, he scarcely had another moment to quietly enjoy his novel surroundings. The next morning he was whisked into conference with the Association—the first of many such conferences. After those morning meetings, which always ended with an elaborate luncheon, he was taken on goodwill tours of factories and cities. He was invited to state dinners (before which he prepared his own separate meal). In the evenings he was taken to concerts and given the balcony seats reserved for dignitaries, and he listened to oddly pleasing music from polished wooden wind instruments that defied description. The planet's greatest artist, a man so old that most of his scales had fallen off, presented him with his masterpiece—a living sculpture that Ahmed wished he could appreciate more. And through it all were innumerable receptions and cocktail parties full of sparkling streamers and a cacophony of incomprehensible clacking speech, where he met hundreds of people that all looked alike and who all (according to the Ambassador's translations) expressed their desire that the Earth join with them.

After the first dizzy month of fetes and interviews, the festivities began to slacken up a bit, for which Ahmed was profoundly grateful. With all the official functions he was beginning to feel as if he had never left his life on Earth, for he had had little time to catch his breath and simply look around.

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One evening the Ambassador actually discovered that through some oversight nothing had been planned for the following day.

"Wonderful!" Ahmed exclaimed joyfully. "Let's do something really different, like going shopping."

"As you wish. I do have here quite a special invitation for the evening, however, that might interest you," the Ambassador replied. "Visiting us for a very short time is Laty Lualia Ri Alual Laia, the most peautiful woman of Alauila, the sole planet of the douple-star system you call 61 Cygni. She is one of the most famed—what is your wort? courtesans—in the Association. She is actually legent, having been the companion of several worlt leaters and the inspirer of countless romances."

An extraterrestrial Scheherazade or Helen of Troy? Ahmed wondered. Well, why shouldn't there be?

"She is vacationing here priefly," the Ambassador continued, "touring all the planets in the Association. That is the first time any one intivitual has done that, too, so you can see that both the Laty ant her voyage are celeprated. When she tiscovered that she woult be here the same time as you, a representative from Earth, she immetiately wrote to me inviting you ant me to a small private tinner, which is tomorrow evening."

"I am not only interested—I am delighted and honored. Please inform the lovely Lady Lualia that I accept this rare opportunity with pleasure."

The next morning Ahmed rose early and tiptoed onto the silent patio to watch the vermilion dawn brighten the sky over the low cream-colored stone buildings. He privately gloried in seeing completely alien earth and sky, at

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not recognizing the native weeds and garden shrubs. After breakfast he and the Ambassador walked to a park just to leisurely converse and throw seeds to gliding creatures under the dark green thin-leafed foliage. Ahmed relished the wonder of doing something so commonplace on an entirely different world so far removed from Earth. He was intrigued by the red flying insects the Ambassador absently slapped. He wanted to fill his pockets with common pebbles.

They returned late in the afternoon when their faces were slightly windburned, and when the sky (which always looked to Ahmed as though it were 4:30 PM) was streaked with violet. As Ahmed bathed and trimmed his beard, he reflected that it had been years since he had felt so happy and alive and *young*. Whistling, he donned one of his finest colorful robes, and departed to meet the Ambassador, a translator, and the legendary Lady Lualia.

The Ambassador's limousine conveyed them to a low white dwelling. They were ushered into an enclosed courtyard that was open to the evening sky. The courtyard actually seemed to be a rock garden of sorts; the ground was sprinkled with fine white sand, and smooth stones ranging in size from pebbles to footstools dotted the periphery. A path of the sand curved across the courtyard to a wide bench placed under an attractive smooth-sheened vine. Red chlorophyll? Ahmed wondered, studying the deep maroon of the supple leafless branches and trunk with interest.

The Ambassador led the way up to the bench. In Arabic she announced: "Laty Lualia Ri Alual Laia from Alauila of 61 Cygni, may I present Al Sayyet Akmet ibn Fyotor Hamilton from Earth of Sol." In her own language she chattered her teeth. The translator keened a wavering whistle almost out of human hearing. The graceful vine inclined a branch—or, more accurately, a tendril—toward the astonished Earthman and replied in a high-frequency ululation that was on the fine edge between sound and pain. The translator clicked and popped an interpretation to the Ambassador, who informed Ahmed in Arabic: "The Laty Lualia says that she is charmed and flattered that you woult take an evening to visit her."

The involved translation process gave Ahmed a few instants to collect his wits. My God, a sentient plant! he marveled. Aloud he responded, bowing: "Please inform the Lady Lualia that the pleasure and the honor is mine."

Lady Lualia extended her tendrils, assaulting Ahmed's ears with that pressure-sound. Get used to it, man, he told himself severely as the translator recounted her words. The Ambassador said: "The Laty invites us to join her at table." She indicated that Ahmed was to sit on a large stone near the broad side of the bench. After he had made himself comfortable at the place of honor, facing the Lady, the Ambassador and the translator sat down on stones at the opposite ends of

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the bench.

A silent attendant laid their places with their native eating implements, then brought in steaming couscous and red wine for Ahmed, an ornate bowl of milky liquid for the Lady Lualia, and mysterious fragrant dishes for the Ambassador and the translator. The food smelled so heavenly that Ahmed wistfully considered asking for a taste, but deferred: he didn't know enough about amino acid chemistry to have any idea what would happen if he tried it.

The Lady Lualia daintily placed the tip of one slender tendril into the bowl and withdrew some of the fluid. The others then also began to eat.

Over the meal the Lady Lualia quizzed Ahmed about the Earth, its terrain, its people and its customs. Ahmed in turn asked her about her world of thinking, feeling plants, how they lived and worked and came to have interplanetary travel. The chain of interpretation that went into every reply was somewhat cumbersome, but occasional mistranslations provided much merriment. Every now and then the Ambassador offered an observation of her own, but principally the conversation was between the visitor from 61 Cygni and the visitor from Sol.

The Lady Lualia was impressed by Ahmed's ownership of his many collections, including a sixth of the land mass on Earth. She was particularly intrigued, however, by his harem. She plied him with detailed questions about human women, which Ahmed was eventually hard put to answer both with accuracy and with taste. He was not at all sure what was gained or lost in translation. At one point he leaned toward the Ambassador and murmured uncomfortably: "How much more can the Lady wish to know? I am glad to oblige her in any way I can, but soon this discussion is going to lose its dignity."

The Lady Lualia keened something and vigorously waved a tendril. Translations ran back and forth for a few moments, and then the Ambassador turned to Ahmed and said with unmistakable amusement: "The Laty Lualia apologizes if she has embarrassed you, but assures you that her interest is purely professional."

"Ah, well, please inform her that I am not at all offended, and in fact would like to know more about herself," Ahmed smiled. He listened at first with polite interest and then with growing admiration to the Lady's straightforward account of the romances and intrigues that made up her life. For any culture she's quite a woman, Ahmed thought, silently toasting her with his glass. Whether it was the wine or his own preconception of what a courtesan should be, Ahmed found himself looking at the Lady Lualia with more open eyes, enjoying the grace of her movements. Moreover, he was all too strongly reminded that he had not seen a human woman now for nearly two months, and the talk of his harem had left him heated and disturbed. Near the end of Lady Lualia's account the Ambassador had

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to ask him a question twice before he came back from Earth.

"I'm sorry, what was that you said?" he asked, chagrined.

"The Lady Lualia inquires whether you woult not stay behint to compare notes more privately."

Allah preserve me, Ahmed sat back. What have I managed to get myself into now? He looked up at the gently swaying vine awaiting his answer, and it occurred to him that after her story he was blamed curious about the Lady Lualia. A gentle memory of the Ambassador that first sunset on the Earth drifted into his mind. Why not? "I would be honored," he bowed.

The three stood up from the bench and the attendant silently removed the dishes. It was only then that Ahmed took a second look around the courtyard. Although night had fallen long ago, the courtyard was softly illuminated—all by light emanating from the pebbles and rocks. Even the rock on which he had been sitting was faintly luminescent.

The Ambassador and the translator offered the Lady Lualia their deepest appreciation for the privilege of dining with her and their best wishes on her continued tour, and then took their leave. Ahmed was left alone with the Lady Lualia, the stars arching above, the stones in the garden glowing like stars on the earth.

The Lady Lualia whistled something briefly and extended a tendril. Ahmed winced at the sound and said gently: "Sh-h, don't speak." He lifted the tendril and saw that its underside had a line of tiny suction disks. Tentatively he drew his finger along them. The tendril arched away; the Lady Lualia whistled softly, then slid the tendril under the sleeve of his robe. As it moved over his arm the little suction disks felt like a line of cool kisses.

Diplomatically, Ahmed's night with the Lady Lualia was one of the best moves he could have made. Overnight, almost, the news of it spread through all the inhabited planets of the Association. To the Association it showed Ahmed's talent for diplomacy and his openness and trust. Moreover, it enhanced his reputation for his variegated harem, and it increased the Lady Lualia's fame for seduction and charm.

In a few days a great personal friend of the Lady Lualia, a visitor from the planetary system of the red dwarf Ross 154, sent Ahmed a letter of introduction and an invitation to compare the artwork of her world and his. Shortly, between his official obligations, he began to meet with noted beautiful women from all over the Association, who traveled all the way to Epsilon Eridani to have dinner and dessert with the man from Earth.

With the gallantry and great humor that Earth women found so fetching, Ahmed enjoyed several tête-à-têtes with an exquisite lady with semitransparent gossamer wings, spent a few days with a fiery-spirited woman who was definitely amphibian, and passed an exhausting week of nights with a charming princess of a nocturnal race.

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And those were only the oxygen-breathers. Ahmed also wore breathing tanks to rendezvous with one lovely creature from an ocean world in a specially constructed tank, to discuss comparative anatomy with a fluorine-breathing biologist with a silicon-based chemistry, and to be involved in a stormy intrigue with a fascinating lady who inhaled an invigorating mixture of swirling methane and ammonia. No sentient in the universe had ever enjoyed the company of so many women of such heavenly variety.

If the truth be told, all these women took up temporary residence on the second planet of Epsilon Eridani because they were as curious about Ahmed as he was about them. For of all the mysteries of the universe, sex is the most profound, and the one question that silently burns in the mind of any sentient meeting another is: *How do they do it*?

Ahmed enjoyed the luxury of being able to answer that question for each sentient he met, one by one. From his detailed survey he discovered the highly interesting fact that all two dozen sentient races in the Association, regardless of their chemistry and independent evolution, had the equivalent of both male and female sex. It seemed to Ahmed that some cosmological principle of biology must be at work, seeing that all higher beings perpetuated themselves by sexual reproduction. That only makes good genetic sense, he reflected after some thought. After all, sexual reproduction, as opposed to parthenogenesis, is the only good way to keep the gene pool freshly mixed.

Beyond the clinical appeal of the question, however, each morning Ahmed opened his eyes and savored the anticipation: what new and exotic treat is in store for me today? The evident curiosity of his companion for that day indicated that clearly that morning she, too, had opened her own eyes (or the equivalent) and savored the same anticipation. This observation suggested to Ahmed something even more interesting: a kind of cosmological principal of the intellect. These two dozen women and I cannot be the only sentients in the universe with such exquisite curiosity, he mused, early one afternoon after bidding his latest visitor a tender farewell. A canny businessman might do very well for himself by providing an elegant discrete setting for wealthy ladies and gentlemen from all over the galaxy to gather and meet others with similar sophisticated taste.

Let's see, he imagined, leaning back on the alien couch. How about a sumptuous resort tempting guests with luscious foods, exotic beverages and the most luxurious furnishings selected from every planet in the Association? Perhaps the resort might be in space, drifting above some magnificent cloud-shrouded planet on which I could buy some wilderness, and run a space shuttle service there each day so that the guests might play at the sports of a score of worlds. And awaiting them in the evenings when they returned, leisurely dining and intimate

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music under the grandeur and the incomparable romantic splendor of the Milky Way . . .

Ahmed pulled out his notepad and began jotting thoughts. On the basis of my combined experience from my harem on Earth and my, ah, temporary "harem" here, I shall create an environment so alluring that it will even charm the jaded and embolden the shy.

All in all, Ahmed was more cheerful than disappointed when his supplies had dwindled to only a month's more food. By that time he felt he had "done" Epsilon Eridani, and it was high time to see how his businesses were faring on Earth. The Ambassador also agreed with him that as much had been accomplished at the Association's headquarters as could be without further word from Earth.

With speeches and music and parades and fanfare, Ahmed, laden with messages and mementos and gifts, was escorted to the spaceport and warmly wished farewell. Once again *Homo sapiens* male, acting representative of the planetary system of Sol, and (consonants) female, Ambassador from the planetary system of Epsilon Eridani, sped into the interstellar void.

During the few weeks that the ship flitted faster than light between the two stars, Ahmed and the Ambassador pored over plans and laws and benefits of the Earth's membership in the Association. Together they forged a number of detailed statements for the 10 billion pairs of ears around Sol.

As soon as they arrived near the orbit of Pluto, Ahmed beamed a private coded message to Hans Grieger. Twelve hours later the coded reply came back—a long summary of the past five month's events. Ahmed scanned it rapidly, noting the salient facts.

It seemed that the contact with the Eridanians had panicked the Earth even more than Ahmed had anticipated, based on how eager and ready human beings had seemed to contact extraterrestrial life. Far from binding the nations of the Earth together, the discovery that there was Someone Else Out There caused each nation to withdraw into itself to look after its own.

Moreover, the confusion precipitated by Ahmed's abrupt disappearance far exceeded Ahmed's expectations. Fear deteriorated international relations, particularly between the West and the Middle East: the Americans and the Europeans openly blamed the Arab countries for Ahmed's "irresponsible behavior." They began to boycott Arab exports. Riots bloodied the streets of major cities. Arabic currencies plummeted on the international money market. Screaming, surly mobs swarmed around Ahmed's power plants, pelting the guards and attack dogs with rotten fruit. And then, by unexpected good fortune, the ugly situation climaxed at 4:30 one quiet May morning two months after Ahmed disappeared, when the overseers of twenty-eight of Ahmed's central power plants were thrown from their beds by explosions. Through the

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hooting alarms anonymous telephone calls claimed that the bombs had been planted by anti-Arab anti-Hamilton reactionaries who bitterly resented "Sayyed Hamilton's cosmic interference."

London, Paris, New York, Atlanta, Tokyo, Rio de Janeiro, Brasilia, Teheran, Tel Aviv, Moscow, Peking and thousands of smaller cities were plunged into blackness. Mass transit was incapacitated. Elevators halted mid-shaft. Burglar alarms were immobilized. Stores and homes were looted and burned.

Still no response from Above.

Ahmed was really gone.

And no one knew when—if—he would return.

When it began to dawn on the world that Ahmed was not somehow watching over things from a distant orbit and able to put them back to rights, the cold shock arrested the panic—but created a recession. Hydroelectric and solar power was not enough to fill the gaping electrical need. Mass transit was hobbled. Industries ranging from automobile manufacturing to meat-packing shut down and laid off employees. Many of Ahmed's own industries closed. The international stock market slid.

Summer approached. The days grew long and hot.

The world sweated.

"Thank God above you're alive," Grieger's message concluded. "Your entire estate is tottering. Tell us what to do."

Ahmed reread the last plea, chuckled and shook his head. After pausing a few moments to compose his thoughts, he turned on the transmitter and sent brief, cordial, open messages to the Chairman, the Shah, the President and the Premier. Then, still tickled, he summoned his lunch.

Ten hours later the replies came back. From then on Ahmed—and later the Ambassador—were anchored in the communications bay of the starship, intensively bargaining with the leaders of the Earth.

Ahmed insisted that the conferences be open worldwide, so that every human being on the planet would fully comprehend the advantages of the Association's transfer of science and technology and the benefits of interstellar trade—and would also be fully aware of the actions of the world's political leaders. The Ambassador conveyed the messages from the Council of the Association and delivered several detailed statements to the world.

Through the negotiations Ahmed relished working on a grand scale, exercising his leverage and strength to bend men's wills, and getting things *done*. He knew victory was at hand when the Earth's most feisty and influential international columnist pointed out that Ahmed's quick action and diplomacy had been "the first step in bringing home the fact that we human beings share but one planet in an entire interstellar community" and that "the time for celestial isolationism has come to an end."

At long last those matters that

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could be handled at long distance had been accomplished. Both Ahmed and the Ambassador had achieved their desire: the Earth had agreed to join the Association. The next day Ahmed was scheduled to embark for Earth and the Ambassador for Epsilon Eridani. Exhausted but satisfied, Ahmed slept.

Several hours later he awoke, still tired but unable to sleep. The sense of well-being had faded, leaving behind a sense of empty denouement. He stared upward into the darkness for a while, then gave up and made the blank wall of his room turn transparent. Spread before him, above and below and all around, lay the universe in all its glory: the rich milky whorls of the galactic plane, the steady brilliant stars, and the sun—distant, but still dominating the black sky with 100 times the brightness of the full moon from Earth. The illusion was such that Ahmed could imagine that he was standing on the brink of a star-spangled abyss, ready to step off. But instead of inspiring him or soothing his spirit, the star-studded vastness somehow filled him with longing. He sighed.

He pulled on a soft robe and slipped out of his cabin to wander aimlessly through the starship's compact corridors. No one seemed to be around—the entire ship seemed to be slumbering. In ten minutes Ahmed glimpsed but a single Eridanian, a workman in a cross-corridor noting the readings of some dials set into a wall. Wordlessly Ahmed passed on, not enjoying his solitary stroll.

Eventually Ahmed was startled to find himself before the Ambassador's door. He hesitated, then softly knocked. The door dilated. "Goot evening, my frient!" the Ambassador rose from her desk and extended her hand. "Dit you rest well?"

Was that pleasure in her husky voice? Ahmed took her hand in both of his, warmed by the unspoken intimacy of two individuals unexpectedly discovering each other to be awake in the dead of night. The door closed behind him, leaving them in the orange circle of light from the lamp over the desk. "Working late?" he asked.

The Ambassador gently disengaged her hand and returned to her desk. "I just have some little pusiness I must take care of tonight."

Ahmed rested his elbow on the top of the desk and lifted a magnificent specimen of some fist-sized pale magenta crystal with infinite refractions of hidden light. "I've been thinking about those broadcasts," he said, turning the crystal in his hand. "Essentially the Premier et al. said 'Fine. Great. Anything. Just take care of this mess back home.' So from here, by remote control, forty-five astronomical units away from the Earth, *I* cleaned the streets, *I* jailed looters, *I* got the bullet trains running again, *I* straightened out world relations, *I* boosted the international stock market fifty points. Sometimes Earth people are so stupid—puling and fretting about what to do when the solution is right before

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their eyes and they're just afraid to act." He snorted. "The President and the Chairman were so glad to hear from me it was indecent. Why, by the way they all snapped to, you would have thought that the whole lot of them were four of my overseers."

The Ambassador leaned back in her chair and fixed him with a direct gaze. "I, too, have been thinking apout those proadcasts, Sayyet Hamilton. The way you set up your empire to collapse in orter to force the Earth's hant—wasn't that what you call plackmail?"

"Blackmail?" Ahmed looked at her askance. "On the contrary, Ambassador, I sacrificed a great part of my empire for the good of the Earth." He returned the crystal to her desk and began pacing the cabin floor. "Blackmail is extortion, for illegal or immoral purposes. Now, I ask you, Ambassador, what did I extort? I went away with you on a diplomatic mission and ungrateful maniacs destroyed some of my property. My business started to fail. Lots of innocent people had to walk to work and suffer through the summer heat without air conditioning, and there was a recession—but I was eleven light-years away. Did I cause it? What could I do to prevent it?

"Now the Earth has decided to join the Association and the international stock market is starting to soar; in a year there'll be an economic boom. But still, my nuclear power plants are in rubble and thousands of my people are starving in the streets." He stopped in front of her and spread his arms out wide. "Do you realize how much it is going to cost me to repair those plants, not to mention the revenue I'll have lost from them all the months they've been down? I'm a partially ruined man, Ambassador, and I am deeply hurt that you can even imagine that there's been blackmail." Ahmed lowered himself into what passed for a couch and heaved a deep and lengthy sigh.

The Ambassador twitched her streamered garb. "I think you are exacherating the facts, Sayyet Hamilton." She returned to some plasticlike

IN TIMES TO COME

What happens when two once-friendly nations begin to clash? Nations take sides, and sympathy gravitates naturally to the underdog. But what if the underdog is wrong? Michael McCollum explores such questions in April's lead story, "Duty, Honor, Planet"—wherein national parks and forests have become battlegrounds—and finds that why people do what they do may be rather complicated. John Sanchez has done a strikingly different cover and interiors for the story.

George W. Harper has an article on how to "Build Your Own A-Bomb and Wake Up the Neighborhood"—a subject of some concern in the popular press. You think maybe it's easy?

We'll also have the conclusion of John Varley's TITAN, plus as many short stories as we can fit in.

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pages on her desk.

Ahmed watched her, suddenly feeling very melancholy and alone. Tomorrow he left for Earth. In a week he would be in his palace again, at home with his nuclear power plants, his Persian rugs, and his harem. Shortly thereafter he would take the first steps toward founding a corporation to educate engineers in the Association's technology of interstellar flight, engineers who would then build and outfit the first fleet of Earth-based interstellar ships. With close supervision, Ahmed calculated, in perhaps five years, or more likely seven or eight, his fleet of courier ships would be the messengers between the stars, regularly carrying news and correspondence through the lanes of space. At that stage he would be free to turn his attention to creating his interstellar resort where romantic and adventurous strangers might rendezvous under the starry Cygnus Arm. If all went well, in ten years he would be accepting the cover charges from his first guests. In ten years his present dreams, far beyond his grandest Earthbound ambitions of five months past, would be within his grasp. In ten years . . .

The very thought made him weary.

In ten years he would be just this side of seventy, late middle age. Over the past five months he had seen more and done more than any human being ever had. The Earth now seemed pretty pedestrian. He had just tasted space, and he was loath to give it up so soon, even to return in ten years. Not even the memory of the 1,001 languorous beauties awaiting his pleasure satisfied him. Maybe I should actually disband the harem, he brooded. Maybe I'm getting old after all.

The Ambassador turned a page.

Ahmed's eyes traveled over her irridenscent pate and lingered on her slender wrist. It would seem strange not to see the Ambassador every day as he had for the past five months. His throat constricted. I am going to miss her.

A soft tone chimed. The office door dilated and a young, vigorous Eridanian strode in. He and the Ambassador chattered and clicked at some length, bending over her desk and comparing pages. Ahmed kept his eyes on the Ambassador, aware of her beauty and observing the efficient way she got things done.

Never before had he met such ability outside of himself. How ironic never to know such kinship on the Earth, yet to find it light-years out in space. It was a totally new sensation, and he was loath to give it up so soon, even to return in ten years.

At length the Ambassador gathered one set of pages into a sheaf and attached them with a seal. After some final instructions she handed the sheaf and the magenta crystal to the Eridanian and he left. The door closed.

The Ambassador straightened the pages on her desk and turned off the lamp. "I apologize for the interruption, my frient. It was a speculator in this neighporhoot. I hat to see him tonight before I left for home."

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"A speculator?" Ahmed repeated, watching her face but not particularly listening to what she said. Is there some way I could contrive to set up the corporate engineering school on Earth and then immediately return to space, and supervise the building of the courier ships by remote control?

"Yes, a speculator in planets. He has to apply for a license to puy or sell a planet, pecause a planet must be inspected ant certified that it has no sentient inhapitants before it can be bought or solt."

"Whole planets?" Ahmed asked, beginning to register her words.

"Sometimes, although usually in shares. Most speculators deal in minerals, although one or two might pe interested in forage crops or ice or methane or some other commodity. This one is interested in quartz, pecause on some untifferentiated basaltic planets such as your fourth planet Mars, quartz is consitered a precious gem."

"But I thought you said that there were only some two dozen planets in the Association."

"There are only two tozen *inhapited* planets. There are huntrets of uninhapited ones, not to mention thousants of asteroits. Ant the needs of the two tozen inhapited planets are quite varied. For example, as you know, my own worlt is relatively metal-poor."

Ahmed sat up straight, wide awake. In a flash the universe lay before him. I'll build the resort on Earth, centered around my own harem! Where else would I ever find an assortment of more beautiful, sophisticated, ladylike, varied representatives of Earth women all ready to play hostess to all sorts of interesting situations? And since the Association views sex as political cement, why, with my harem I'll control the strongest diplomatic corps—and wield the most political clout—in the known universe! Inhabitants, details: What besides the Ambassador is there to stop me from collecting, and running, every single planet in the Association—starting with Earth?

Ahmed drew a deep breath, calming his racing heart, steadying his trembling hands, doing his best not to let the Ambassador even suspect. Casually he inquired: "How does one set about speculating on shares of a planet?"

The Ambassador contemplated Ahmed with unmistakable pleasure. "Why all these questions, Akmet?" she asked softly. "Are you consitering remaining in space somewhat longer?" She lifted the sheaf of pages, rose from her desk, crossed the room, and sat down next to him on the couch. "Here is the speculator's application for a license, descriping the shares of the various planets he wishes to puy ant sell." She read aloud, translating portions of the curious angular script.

Slowly Ahmed's feet began to itch. A blissful smile tugged his mouth. Caliph Ahmed ibn Fyodor Hamilton, Master of the Universe. Ah! "My dear Ambassador, would you mind calling that man back?" ■

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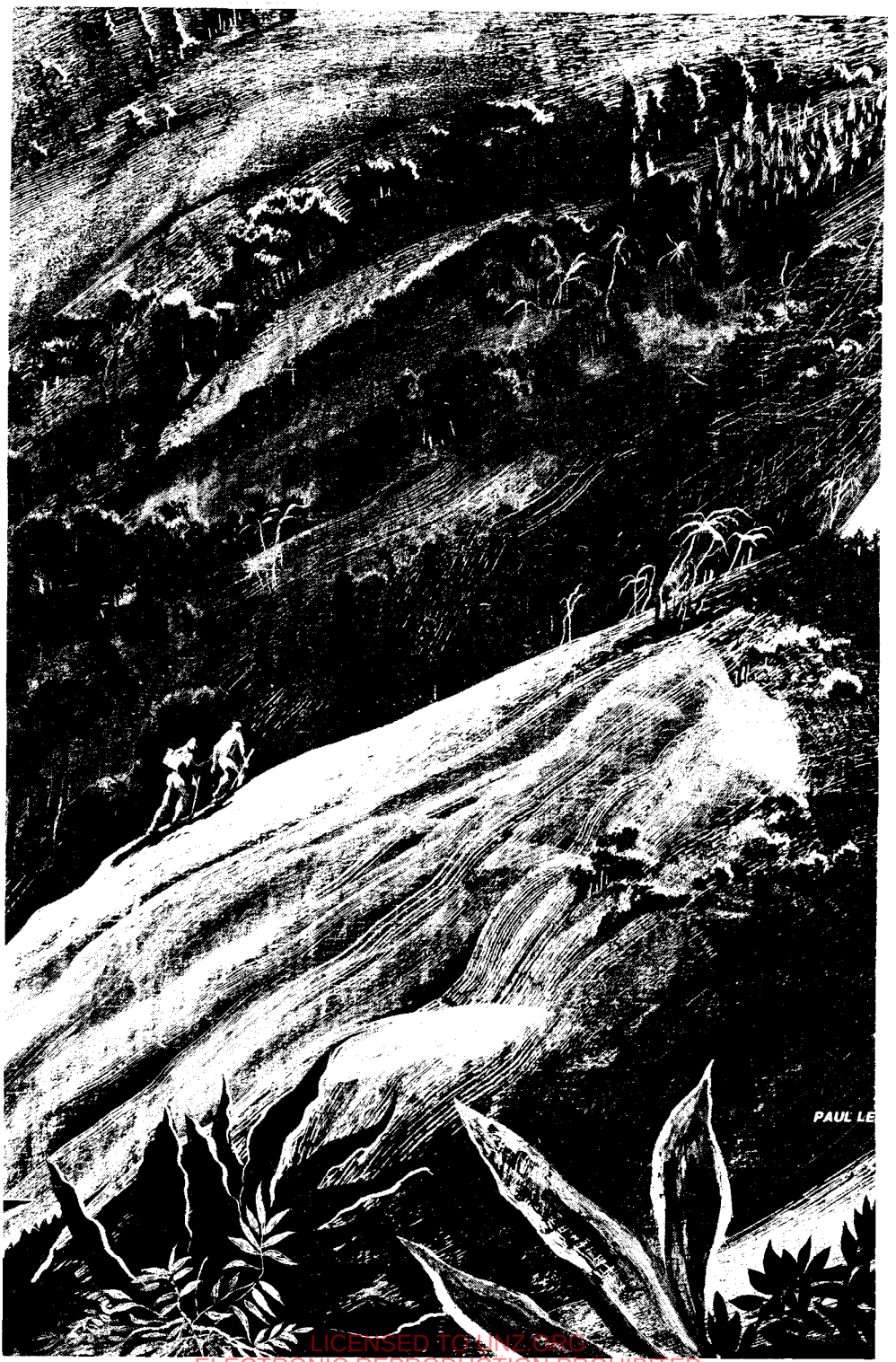

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JOHN VARLEY TITAN

PART THREE OF FOUR PARTS

SYNOPSIS

The year is 2025. DSV Ringmaster *is on the first voyage of exploration in the past eleven years. The destination is Saturn, and the Captain is Cirocco Jones, a thirty-four-year-old veteran astronaut. There are three men and three women under her command:*

First Officer William Rubin, 40. Rubin functions as ship's engineer, and during the trip has become romantically involved with Captain Jones.

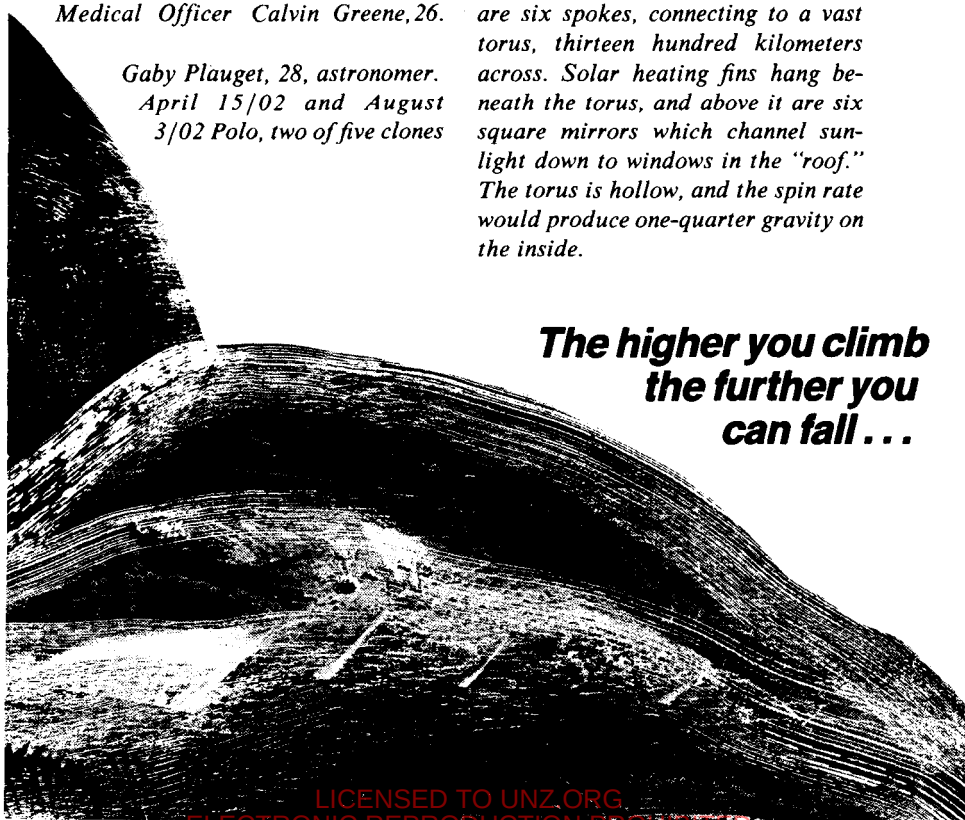
Satellite Exploration Module Pilot Eugene Springfield, 29.

Medical Officer Calvin Greene, 26.

Gaby Plauget, 28, astronomer. April 15/02 and August 3/02 Polo, two of five clones of their Nobel Prize-winning mother, Susan, who handle geology, chemistry, and physics between them.

The monotony of the trip is interrupted by Gaby's discovery, while still some distance from Saturn, of an eleventh moon. She names it Themis, and soon finds it is no ordinary moon. It is almost certainly an artifact: an interstellar spacecraft, or a colony world. But who built it, and where are they now?

Themis is shaped like a wagon wheel. There is a hub with a hole in the center. Radiating from the hub are six spokes, connecting to a vast torus, thirteen hundred kilometers across. Solar heating fins hang beneath the torus, and above it are six square mirrors which channel sunlight down to windows in the "roof." The torus is hollow, and the spin rate would produce one-quarter gravity on the inside.



The higher you climb the further you can fall . . .

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Ringmaster's *mission profile is quickly scraped, and Cirocco is ordered to orbit Themis. This proves difficult because of its odd shape, but she manages to station her ship beneath the torus.*

She wonders how she is going to enter it, but Themis makes the decision for her. A gigantic grapple seizes Ringmaster, *destroying it. Smaller grapples gather every piece of debris, including the crew, and they are swallowed up. There follows a period of complete sensory deprivation. Cirocco believes she has been eaten by a giant animal, and in time is expelled from beneath the ground, naked and hairless. Only the metal parts of her suit have survived.*

With the remains of her suit radio Cirocco contacts Gaby, and the two soon get together. Gaby has been changed by her sensory deprivation; she is no longer interested in astronomy, and she believes she is in love with Cirocco. The two women find a stream winding through a dense jungle and begin to follow it. They have little sense of time, as any point inside Themis is always in light or darkness, depending on its location. They are in a region of daylight, a perpetual afternoon. The climate is temperate, but they encounter a sudden wind accompanied by a deep moaning sound and followed by a snowfall. The snow melts rapidly on the warm ground.

The stream leads them to a two-kilometer cliff, where they discover they are near one wall of the torus. From their vantage point they can see almost half of the interior curving up on either side of them. Sprouting from the land are huge cables that vanish through the roof.

As they are looking, they hear a voice from overhead. It is Calvin Greene, sitting in a tree.

Calvin has been listening to them, but could not reply because his suit mike was destroyed. He, like Gaby, has been changed by isolation. He awoke knowing how to communicate with a species of living blimps. He introduces the women to one named Whistlestop, and proposes that the ride to the base of the cliff, where Bill and August are camped. Gaby is reluctant, having acquired a phobia of being eaten alive, but goes when she realizes it is the only way of staying with Cirocco.

The blimp can make parachutes, which the three use to join Bill and August. But no sooner are they on the ground than Calvin announces he will be leaving on his own. He no longer desires the company of humans, preferring to be with the blimps. He leaves, taking August to help her search for her sister.

Cirocco, Gaby, and Bill build a boat—the Titanic*—from a large nutshell, and begin to sail down the Clio to the central river of Themis, the Ophion. They have named the day region they are moving through Hyperion, and the night areas on each side are Oceanus and Rhea. Oceanus is dominated by a vast frozen sea.*

On the way, Bill's leg is broken in a

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fight with a mudfish. When the women get him to shore, they encounter centauroid creatures called titanides. To her astonishment, Cirocco finds that she can talk—or rather sing—to them. She has learned the language in a way she does not understand, while inside the creature that ate her ship.

A healer is summoned. After a period of indecision while Cirocco worries if the titanide medicine will do more harm than good, Cirocco lets the treatment begin.

CHAPTER TWELVE

Cirocco found she had some preconceptions that had to be discarded.

The first was the most obvious. When B♭ arrived and looked much like C♯ except for his sexual organs, she had assumed titanides were going to be hard to tell apart.

The group that showed up on response to C♯'s call looked like escapees from a merry-go-round.

The healer had an emerald green head and tail hair. The rest of her body was covered in thick, snow-white fur. There was another hairy one: a strawberry blonde with a dappling of violet. There was a brown and white pinto, and one without any hair at all except on his tail. His skin was pale blue.

The last of the group looked naked but was not; she had the pelt of a horse not only on the part of her where it would have looked reasonable, but on her human upper-half, too. She was zebra-striped in bright yellow and searing orange, and had lavender head and tail hair. Looking away from her did no good; the image burned itself into the retina.

Not satisfied with the carnival atmosphere, the titanides painted their bare skins and stained patches of their hair. They wore necklaces and bracelets, stuck baubles in holes pierced through noses and ears, tied chains of brass links and colored stones or ropes of flowers around their legs. Each had a musical instrument slung over the shoulder or protruding from the pouch, made of wood or animal horn or seashell or brass.

The second preconception—which was actually the first, since Calvin had told them about it—was that titanides were all female. A tactful question to the healer brought a straightforward answer and an awesome demonstration. The titanides each had three sex organs.

She knew about the frontal, human-sized male or female genitalia. These determined the pronoun gender for reasons that must have made sense to a titanide.

In addition, each had a large vaginal opening under the tail, just like a female horse.

It was the one in the middle that shocked Gaby and Cirocco. In the soft belly between the healer's hind legs was a thick, fleshy sheath, and out of it came a penis that was human in every detail but for the fact that it was as long and thick as Cirocco's arm.

Cirocco had thought herself sophisticated. She had seen many naked men, and it had been years since any

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of them had anything new to show her. She liked men and she liked intercourse, but that thing made her think about becoming a nun. Her strong reaction disturbed her. She knew it was the same feeling Gaby had expressed, that of being more upset by close parallels than by something utterly alien.

The third thing Cirocco had to rethink was triggered by the realization that, though she knew the language and could now use the nouns for each of the titanide sex organs, she had not known of the rear ones until told about them. She still did not know why there were three, and could not find the knowledge in her mind.

What she had was word lists and grammatical rules of composition. It worked well for nouns; she had only to think of an object to know the word. It began to fail with some of the verbs. Running and jumping and swimming and breathing were clear enough. Verbs for things titanides did and humans didn't were not so neat.

Where the system fell apart was in describing familial relationships, codes of behaviors, mores, and a host of other things where titanides and humans shared little common ground. These concepts became null notes in the titanide songs. She sometimes translated them to herself or to Gaby with complex hyphenates such as she-who - is - my - mindmother's - frontal - ortho-sibling, or the-sense-of-righteous-loathing-for-angels. These phrases were each one word in titanide song.

It came down to the fact that an alien thought in her head was still an alien thought. She could not deal with it until it was explained to her; she had no referents.

The last complication caused by the arrival of the healer's group was in the matter of names. There were too many names in the same key signatures, so her original system fell apart. Gaby couldn't sing them, so Cirocco had to find English words to use.

She had started off in a musical vein, and decided to continue it. The first one they met she now dubbed C♯ Hornpipe because the name sounded like a sailor's hornpipe. B♭ became B♭ Banjo. The healer was B Lullaby, the strawberry blonde was G Minor Valse, the pinto B Clarino, and the blue titanide now bore the name of G Foxtrot. She called the yellow and orange zebra D Minor Hurdy-gurdy.

Gaby promptly dropped the key signatures, as someone who was always being called Rocky should have known she would.

The ambulance was a long wooden wagon with four rubber-tired wheels, pulled by two titanides in loose harness. It had a pneumatic suspension and friction brakes operated by the team of pullers. The wood was bright yellow, like new pine, milled wondrously smooth and fitted together with no nails.

Cirocco and Gaby put Bill on a huge bed in the center of the wagon and climbed in after him, along with Lullaby, the titanide healer. She took

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her station at his bedside, legs folded beneath her, singing to him and wiping his brow with a wet cloth. The other titanides walked alongside, except for Hornpipe and Banjo, who remained behind with their flocks. They had around two hundred animals the size of cows, each with four legs and a thin, supple neck three meters long. The necks had digging claws and puckered mouths at the end. They fed by forcing their mouths into the ground and sucking milk from the backs of sludgeworms. They had one eye at the base of the neck. With their heads in the ground they could still see what was happening above.

Gaby looked at one with a faintly scandalized expression on her face, reluctant to admit that such a thing could exist.

" 'Gaea has her good days and her bad days,' " she concluded, quoting a titanide aphorism Cirocco had translated. "She must have come off a nine-day binge when she thought *that* one up. What about those radios, Rocky? Can we get a look at them?"

"I'll see." She sang to Clarino, the pinto, asking if they might look at his speakerplant, then stopped as soon as she had the word out.

"They don't build them," she said. "They grown them."

"Why didn't you say so before?"

"Because I just now realized it. Bear with me, Gaby. The word for them means 'the seed of the plant that carries song.' Take a look."

The item strapped to the end of Clarino's staff was an oblong yellow seed, smooth and featureless but for a soft brown spot.

"It listens here," Clarino sang, indicating the spot. "Do not touch it, as it will go deaf. It sings your song to its mother, and if she is pleased she sings it to the world."

"I fear I do not entirely understand."

Clarino pointed over Gaby's shoulder. "There is one who still has her children."

He trotted to a clump of bushes growing in a hollow. A bell-shaped growth emerged from the ground beside each bush. Grasping the bell, he wrenched a plant free and carried it, roots and all, back to the wagon.

"One sings to the seeds," he explained. He took his brass horn from his shoulder and played several bars of a dance in five-four time. "Bend your ears now . . ." He stopped, embarrassed. "That is, do what your kind does to enhance your hearing."

After half a minute, they heard the horn notes, reedy as an old Edison cylinder, but quite distinct. Clarino sang a harmonic, which was quickly repeated. There was a pause, then the two themes were played simultaneously.

"She hears my song and likes it, you see?" Clarino sang, with a big smile on his face.

"Like the request line of a radio station," Gaby said. "What if the disc jockey doesn't want to play that song?"

Cirocco translated Gaby's question as best she could.

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"It takes practice to sing pleasingly," Clarino acknowledged. "But they are of good faith. The mother can speak more swiftly than four feet can fly."

Cirocco translated but Clarino interrupted her.

"The seeds are also useful in building the eyes that see in darkness," he sang. "With them we scan the well of wind for the approach of angels."

"That sounded like radar," Cirocco said.

Gaby eyed her dubiously. "You going to believe everything these overeducated polo ponies tell you?"

"You tell me how those seeds work if it isn't electronically. Would you prefer mental telepathy?"

"Magic might be easier to swallow."

"Call it magic, then. I think there're crystals and circuits in those seeds. And if you can grow an organic radio, why not radar?"

"Maybe radio. Only because I've seen it with my own eyes, *not* because I want to have anything to do with it. But not radar."

The titanic radar installation was under a tent in the front of the ambulance. It would have baffled Rube Goldberg. There were nuts and leaves attached to a pot of soil with thick coppervines leading into it. Lullaby said the soil contained a worm which generated "essence of power." There was a rack of radio seeds connected with snarls of needle-tipped vines, apparently inserted with some precision since each seed had a tight cluster of oozing pinpricks around the spot where contact had finally been made. There were other things, all of a vegetable nature, including a leaf that glowed when struck by a beam of light from yet another plant.

"It's easy to read," Lullaby sang, cheerfully. "This dot of false fire represents the sky giant you see over there, toward Rhea." She indicated a spot on the screen with her finger. "See how it loses life . . . there! Now it shines brightly, but shifted."

Cirocco began a translation, but Gaby interrupted her.

"I know how radar works," she grumbled. "The whole setup offends me."

"We have little need of it now," Clarino assured them. "This is not the season for angels. They come when Gaea breathes from the east, and torment us until she sucks them back to her breast."

Cirocco wondered if she heard that right; did she sing "sucks them *at* her breast?" She didn't pursue it because Bill groaned and opened his eyes.

"Hello," Lullaby sang. "So glad you could come back."

Bill yelped, then screamed when he put pressure on his leg.

Cirocco put herself between Bill and Lullaby. He saw her, and sighed in relief.

"*Very* bad dream, Rocky," he said.

She rubbed his forehead. "It wasn't all a dream, probably."

"Huh? Oh, you mean the centaurs. No, I remember when the white one

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was rocking me and singing."

"Well, how are you feeling, then?"

"Weak. My leg doesn't hurt so bad. Is that a good sign, or is it dead?"

"I think you're getting better."

"What about . . . uh, you know. Gangrene." He looked away from her.

"I don't think so. It looked a lot better after the healer treated you."

"Healer? The centaur?"

"It was all there was left to do," Cirocco said, doubts overwhelming her again. "Calvin hasn't arrived. I watched her, and she seemed to know what she was doing."

She thought he had gone back to sleep. After a long time his eyes opened and he smiled faintly.

"It's not a decision I'd have wanted to make."

"It was terrible, Bill. She said you were dying, and I believed her. It was either do nothing until Calvin got here—and I don't know what *he* could do without any medicine—and *she* said she could kill the germs, which made sense because—"

He touched her knee. His hand was cold, but steady.

"You did the right thing," he said. "Watch me. I'm going to be walking in another week."

It was late afternoon—always, monotonously, late afternoon—and someone was shaking her shoulder. She blinked rapidly.

"Your friends have arrived," Foxtrot sang.

"It was the sky giant we saw earlier," Lullaby added. "They were aboard all the time."

"Friends?"

"Yes, your healer, and two others."

"Two . . ." She got to her feet. "Those others. Do you have news of them? One is known to me. Is the second like her, or male, like my friend Bill?"

The healer frowned. "Your pronouns confuse me. I frankly do not know which of you is male and which female, since you hide behind strips of cloth."

"Bill's male, me and Gaby are female. I'll explain it to you later, but which one is on the sky giant?"

Lullaby shrugged. "The giant did not say. He is as bemused as I."

Whistlestop hovered over the column of titanides and the wagon, which had halted to wait for the drop. A chute blossomed with a tiny black figure on the end of it. Calvin, no doubt about it.

While he drifted down another chute appeared, and Ciricco strained to see who it might be. The figure looked too big, somehow. Then a third chute opened, and a fourth.

There were a dozen parachutes in the air before she spotted Gene. The rest, incredibly, were titanides.

"Hey, it's Gene!" Gaby yelled. She was standing a short distance away with Foxtrot and Clarino. Cirocco had stayed with the wagon. "I wonder if April is —"

"*Angels*! Angels attacking! Form up!"

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The voice was a screech: a titanide voice that had lost all its music, choked with hate. Cirocco was dumbfounded to see Lullaby hunched over the radar set, shouting orders. Her face was contorted, all thought of Bill forgotten.

"What's going on?" she began, then ducked as Lullaby vaulted over her.

"Get down, two-legs! Stay out of this."

Cirocco looked up, and the sky was filled with wings.

They were dropping around the sides of the blimp, wings tucked to gain speed, attacking the falling titanides who hung helplessly from their shrouds. There were dozens of them.

She was thrown to the floor of the wagon when it jerked forward to the sound of snapping harness leather. She just missed falling out the open tailgate, struggled to her hands and knees in time to see Gaby leap and catch the sides of the wagon with her hands. Cirocco helped her in.

"What the hell's going on?" Gaby held a bronze sword Cirocco had not seen before.

"Watch out!" Bill was tossed from his bed. Cirocco crawled to him and tried to get him back in, but the wagon kept crashing over rocks and crevices.

"Stop this thing, goddamn it!" Cirocco yelled, then sang it in titanide. It made no difference. The two hitched in front were heading for the battle and nothing would stop them. One held a sword which she brandished above her, shrieking like a demon.

Cirocco slapped one of them on the rump and almost lost her scalp as the sword flashed at her. Keeping her head low, she looked down at the knots hitching the titanides to the wagon.

"Gaby, give me that thing, quick." The sword came through the air hilt-first and landed at her feet. She hacked at the leather harnesses. One came free, then the other.

The titanides did not notice the loss. They quickly outdistanced the wagon, which then slammed to a halt against a boulder.

"What was that all—"

"I don't know. All anyone told me is to stay low. Give me a hand with Bill, will you?"

He was awake, and did not seem to be hurt. He watched the sky as they put him back on the pallet.

"Holy Christ," he said, just loud enough to be heard over the screech of the titanides. "They're getting murdered up there."

Cirocco looked up in time to see one of the flying creatures slash three parachute shrouds above one of the descending titanides. The chute folded. With sickening speed the titanide vanished behind a low hill to the west.

"Those are angels?" Bill wondered.

To titanides, they were angels of death. Human in shape, with feathered wings that measured seven meters from tip to tip, the angels turned the peaceful air over Hyperion into a slaughterhouse. All the parachutes were soon cleared from the sky.

The battle went on behind the hill,

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out of their sight. Titanides screeched like fingernails on a blackboard, and high above was an eerie wail that had to be the angels.

"Behind you," Gaby warned. Cirocco turned quickly.

An angel approached silently from the east. It skimmed the ground, great wings motionless, growing larger with impossible speed. She saw the sword in its left hand, the human face twisted with bloodlust, tears streaking from the corners of the eyes, the muscles knotting in the arm as it brought the sword back . . .

It passed over them, beating its wings to rise over the low hill. The tips touched the ground and stirred gouts of dust.

"Missed me," Gaby said.

"Sit down," Cirocco told her. "You make a great target standing up like that. And it did *not* miss you. It changed its mind at the last moment; I saw it stop the swing."

"Why did it do that?" She crouched beside Cirocco and scanned the horizon.

"I don't know. Most likely because you don't have four legs. But the next one might not be so observant."

They watched another angel approach from a slightly different angle. It sliced through the air, legs together, some kind of tail surface extending behind its feet, arms at its sides, wings twitching just enough to maintain speed. In grace and economy of motion, Cirocco had never seen its equal.

They saw another build speed by flying straight at the ground. It pulled out at the last possible instant, kissing the ground until it vanished over the brow of the hill. Any crop duster in the world would have been hollow-eyed and white-faced.

"They're very good," Gaby whispered.

"I wouldn't want to get in a dogfight with them," Cirocco agreed. "They'd fly the pants off me."

A chilly wind blew up from the east, raising dust from the dry ground.

Then the titanides came charging around the hill, followed by a flock of angels. Cirocco recognized Lullaby and Clarino and Foxtrot. Clarino's left foreleg was red with blood. The titanides carried wooden lances tipped with brass, and bronze swords.

They were no longer giving voice to their battle song, but the frenzy was still in their eyes. Steam puffed from their nostrils and the ones with bare skin glistened. They thundered by, then wheeled to face the angels.

"They're using the wagon for cover!" Gaby shouted. "We're going to be caught in the middle. Get off, quick!"

"What about Bill?" Cirocco yelled.

Gaby's eyes locked with hers for an instant. She seemed about to speak, then growled something unintelligible and took her sword from Cirocco. With a lot more courage than common sense, she stood at the back of the wagon and faced the oncoming angels. Once again, all Cirocco could see was her back as she stood between her love

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and approaching danger.

The angels ignored her.

She stood with her sword ready, but they went around the sides of the wagon to reach the titanides who were making a stand behind it.

The noise was beyond belief. The wail of the angels mixed with the shriek of the titanides while scores of giant wings tore the air.

A monstrous shape loomed out of the dust cloud, a nightmare painted in shades of brown and black, wings moving like shadows come to life. It was blind, sword and lance jabbing aimlessly as the angel tried to get its bearings in the miasma. It seemed no larger than a child of ten. Dark blood ran from a wound in its side.

It was above them when it hurled its lance. The brass tip passed through the sleeve of Gaby's robe and bit into the floor of the wagon, twanging like a bowstring. Then the angel was past them, and a wooden spear was growing from its neck. It fell, and Cirocco could see nothing more.

As quickly as the battle had come to them, it was gone. The wailing took on a different note and the angels rose, dwindled, became nothing but flapping shapes high in the air, headed east.

There was a commotion on the ground beside the wagon. The three titanides were trampling the body of the fallen angel. It was hard to tell that the body had ever looked human. Cirocco looked away, sickened by the blood and the murderous rage on the faces of the titanides.

"What do you think made them go away?" Gaby asked. "Just a couple more minutes and they'd have wrapped it up."

"They must know something we don't," Cirocco said.

Bill was looking to the west.

"There," he said, pointing. "Somebody's coming."

Cirocco saw two familiar figures. It was Hornpipe and Banjo, the shepherds, approaching at full gallop.

Gaby laughed, bitterly. "You'll have to show me something better than that. One of those kids is only three years old, Rocky said."

"There," Bill said again, pointing the other way.

Over the hill came a wave of titanides, like a motley cavalry.

CHAPTER THIRTEEN

Bill was doing well in that he was healing but Calvin said the bone had not been set properly.

"So how much longer will it be?" Bill asked. He had asked the question before. There was nothing to read, no television to watch; nothing but the window looking out over a dark street in Titantown. He could not speak to his nurses except in pidgen ditties. Lullaby was learning English, but very slowly.

"At least two more weeks," Calvin said.

"I feel like I could walk on it now."

"You probably could, and that's the danger. It'd pop like a dry stick. No, I won't let you up, even on crutches, for

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another two weeks."

"What about taking him outside?" Cirocco asked.

"Would you like to go outside, Bill?"

They took Bill and his bed out the door and a short distance along the street before putting him down beneath one of the canopied trees that made Titantown invisible from the air, and provided the nearest approach to night they had seen since their exploration of the cable base. The titanides kept their homes and streets lighted all the time.

"Have you seen Gene today?" Cirocco asked.

"Depends on what you mean by today," Calvin asked, with a yawn. "You still have my watch."

"But you haven't seen him?"

Calvin shook his head. "Not for a while."

"I wonder what he's been up to."

Calvin had found Gene following the Ophion through steep terrain as it wound its way among the Nemesis Mountains of Crius, the day region just west of Rhea. He said he had emerged in the twilight zone, and had been walking ever since, trying to hook up with the others.

When asked what he'd been doing, all he would say was "surviving." Cirocco didn't doubt that, but wondered just what he meant by it. He brushed off his own experiences in sensory deprivation, saying he had been worried at first but calmed down when he understood the situation.

Cirocco wasn't sure she knew what he meant by that, either.

At first she was happy to have someone who seemed as minimally affected as she had been. Gaby still moaned in her sleep. Bill had gaps in his memory, though it was returning slowly. August was chronically depressed and verging on the suicidal. Calvin was happy but wanted to be alone. Only she and Gene seemed relatively unchanged.

But she knew she had been touched by mystery during her stay in the darkness. She could sing to the titanides. She felt more had happened to Gene than he was talking about, and she began to look for signs of it.

He smiled a lot. He kept assuring everyone he was okay, even when no one asked. He was friendly. Sometimes it was too hearty, but other than that he seemed fine.

She decided to find him and try once more to talk about the missing months.

She liked Titantown.

It was warm under the trees. Since the heat in Gaea came from the ground up, the high vault acted to trap it. It was a dry heat: by wearing a light shirt and no shoes, Cirocco found her body cooled itself at peak efficiency. The street were pleasantly lighted with paper lanterns that reminded her of the Japanese. The ground was hard-packed earth, moistened by things called sprinklerplants that sprayed mist once per revolution. When that happened it smelled like a summer nights's light rainfall. Hedges were so

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crusted with flowers that petals fell from them in a steady rain. They grew quite well in perpetual darkness.

The titanides had never heard of urban planning. Dwellings were scattered haphazardly on the ground, under the ground, and even in the trees. Roads were informally defined by traffic. There were no signs or named streets, and a map of the town would soon have been covered with corrections as new homes were grown in the middle of the road and pedestrians trampled their way through hedges until a new equilibrium was established.

Everyone had a cheery song of greeting for her.

"Hello, Earth monster! Still balanced, I see."

"Oh, look, it's the two-legged oddity. Come and feast with us, Sheer-ah-ko."

"Sorry, folks," she sang. "Got business. Have you seen C♯ Meistersinger?"

It amused her to translate their songs that way, though in titanide, monster and oddity held no insult.

But the invitation to feast was a hard one to turn down. After two months of raw meat and bland fruit, the titanides' food was too good to be true. Their cuisine was their greatest art form, and with a few minor exceptions the humans could eat anything the titanides could eat.

She found the building she called City Hall more by luck than design, stopping frequently to ask directions. (First left, second right, then around the . . . no, that was blocked last kilorev, wasn't it?) The titanides understood the layout, but she didn't think she ever would.

It was City Hall simply because Meistersinger lived there, and he was the titanides' closest approach to leadership. Actually, he was a warlord, but even that was limited. It was Meistersinger who led the reinforcements on the day of the battle with the angels. Since then, he had behaved like everyone else.

Cirocco had meant to ask if he knew where Gene might be found, but it was not necessary. Gene was already there.

"Rocky, so glad you could drop by," he said, getting up and putting his arm over her shoulder. He kissed her lightly on the cheek, which annoyed her.

"Me and Meistersinger were just talking over a couple things you might be interested in."

"You were . . . you can speak to them?"

"His phrasing is atrocious," Meistersinger sang, in the difficult aeolian mode, "in the manner of the Crian peoples. His voice will not settle decently, and his ear is more suited to the . . . shall we say unmodulated words of your own pipes. But we can sing together, after a fashion."

"I heard some of that," Gene sang, laughing. "Thinks he can talk over my head, like spelling words in front of a baby."

"Why didn't you tell me this before, Gene?" she said, searching his eyes.

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"I didn't think it was important," he said, waving it off. "I got a dose of what you got, but it didn't take so well."

"I just wish you'd told me, that's all."

"I'm sorry, okay?" He seemed irritated, and she wondered if he had meant her to know. Surely he didn't think he could have concealed it much longer.

"Gene has been telling me many interesting things." Meistersinger sang. "He has made lines all over my table, but they make little sense to me. I would understand, and pray that your superior song might clear away the darkness."

"Yeah, Rocky, you take a shot. I can't get this dumb son-of-a-donkey to see it."

Cirocco glanced sharply at him, relaxed when she recalled Meistersinger knew no English. She still thought it bad mannered and childish. The titanide was anything but stupid.

Meistersinger was kneeling beside one of the low tables the titanides preferred. He had dull orange fur a few centimeters long, with only his face bare. The skin was chocolate brown. His eyes were light gray, set in a face that had at first seemed identical for titanides, but now seemed to Cirocco to have as many variations as human faces. She could now tell one from another without reference to coloring.

But the face was still a female one. She could not shake that cultural conditioning, even when the titanide's penis was clearly visible.

Gene had used skin paint to draw a map on Meistersinger's table. Two parallel lines ran east and west, and other lines cut the space between into rectangles. It was the inner rim of Gaea, spread out and seen from above.

"Here's Hyperion," he said, jabbing with a paint-reddened finger. "On the west, Oceanus, on the east . . . what did you call it?"

"Rhea."

"Right. Then comes Crius. There's support cables running here, here, and here. Titanides live in east Hyperion, and west Crius. But there are no angels in Rhea. Do you know why, Rocky? Because they live in the spokes."

"What's this about, anyway?"

"Bear with me. Make him understand, will you?"

She did her best. After several attempts, he looked interested and put one orange-nailed finger near a dot in the west Hyperion.

"This, then, would be the great stairway to heaven near the village?"

"Yes, and Titantown is next to it."

Meistersinger frowned. "Why do I see it not?"

"I got that," Gene said, in English. "Cause I've drawed it not," he sang. With a flourish, he made another dot beside the larger one.

"How will these lines kill all of the angels?" Meistersinger asked.

Gene turned to Cirocco. "Did he ask why I'm drawing all this?"

"No, he asked what this has to do

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with killing angels, and I'd like to add a question of my own, which is *what in hell are you doing*? I forbid you to go on with this decision. We can't aid either side of two warring nations. Didn't you read the Geneva Contact Protocols?"

Gene was silent for a moment, looking away from her. When he looked back, he spoke quietly.

"Don't you remember that slaughter, or did you really miss it all? They got wiped out, Rocky. Fifteen of these jackasses jumped. All but one died, and so did two more that were with you. The angels lost two, plus one wounded."

"Three. You didn't see what happened to the third." It still made her sick to think of it.

"Whatever. The thing is, it was a new tactic. The angels hitched a ride on top of the blimp. At first we thought the angels had made an alliance with the blimps, but it turns out the blimps are upset, too. They're neutrals. The angels got aboard during a storm so the blimp thought the extra weight was just water. He gains a couple of tons when it rains."

"What's all this 'we' stuff? Are you making an alliance? You don't have that power. *I* do, as ship's Captain."

"Maybe I should point out that your ship is gone."

If he had meant to wound her, his aim could not have been better. She cleared her throat, and went on. "Gene, we're not here as military advisors."

"Hell, I just thought I'd show them a few things. Like this map. You can't plan strategy without a map. They'll need some new tactics, too, but—"

Meistersinger made the high whistle that served as a throat-clearing sound. Cirocco realized they had been ignoring him.

"Pardon me," he sang. "This drawing is a fine thing indeed. I will have it painted on my chest at the next tri-city jamboree. But we were speaking of ways to kill angels. I would be pleased to hear more of the gray powder of violence you mentioned earlier."

"*Je*-zus, Gene!" Cirocco exploded, then controlled her voice. "Meistersinger. My friend, whose command of your songs is poor, must have expressed himself badly. I know of no such powder."

Meistersinger's eyes were bland pools. "If not the gray powder, then speak to me of the device for hurling spears into the air farther than the hand can throw."

"Again, you must have misunderstood. Bear with me for a moment longer, please." She turned to Gene, trying for a calm front. "Gene, get out. I'll talk to you later."

"Rocky, all I want to do is—"

"That's an order, Gene."

He hesitated. She was trained in hand combat and had the longer reach, but he was trained, too, and had more strength. She was far from sure she could beat him, but got ready to try.

The moment passed. Gene relaxed, then slammed his palm on the table and stalked from the room. Meistersinger had followed it with eyes that

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missed nothing.

"I'm sorry if I caused bad feeling to flow between you and your friend," the titanide sang.

"It was not your fault." Her hands were cold now that the confrontation was over. "I . . . see here, Meistersinger," she sang in equals mode. "Which did you believe? Me, or Gene?"

"Face it, Rah-Kee, you looked like you had something to hide."

Cirocco chewed a knuckle while wondering what to do. The titanide was sure she was lying, but how much did he already know?

"You're right," she sang at last. "We have a powder of violence, strong enough to destroy this entire town. We know secrets of destruction that I am ashamed to even hint at; things that could blow a hole in your world and leak the air you breathe into cold space."

"We need nothing like that," Meistersinger sang, looking interested. "The powder will do nicely."

"I can't give it to you. We brought none with us."

The titanide had obviously considered his song carefully when he finally sang again.

"Your friend Gene thought it possible to make these things. We are clever with wood, and the chemistry of living things."

Cirocco sighed. "He's probably right. But we cannot give you the secrets."

Meistersinger was silent.

"My own personal feelings have little to do with the matter," she explained. "Those who are above me, the wise ones of my kind, have said this should be so."

Meistersinger shrugged. "If your elders command it, you have little choice."

"I'm glad you see it that way."

"Yes." He paused, again choosing his song carefully.

"Your friend Gene is not so respectful of his elders. If I asked him again, he might tell me things that I need for victory."

Her heart sank, but she tried not to let him see.

"Gene was forgetful. He had a difficult time in his journey; his thoughts wandered, but now I have reminded him of his duty."

"I see." He pondered again, offering her a glass of wine, which she drank gratefully.

"I believe I myself could construct a launcher of spears. A flexible stick, ends tied together with a thong."

"Frankly, I'm surprised you don't have it already. You have much more complex things."

"We do have something like it which children use for games."

"The nature of your war with the angels puzzles me. Why do you fight?"

Meistersinger frowned. "Because they are angels."

"There's no other reason? I had been impressed with your tolerance of other races. You feel no animosity for me and my friends, or the blimps, or the yeti in Oceanus."

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"They are *angels*," he repeated.

"You don't wish to live in the same land?"

"Angels would be unable to suckle their young at Gaea's breast if they left the great towers. And we could not live clinging to the walls.

"So you don't compete for land or food. Could the reason be religious? Do they worship another god?"

He laughed. "Worship? You put your song together oddly. There is only one Goddess, even to the angels. Gaea is known to all races within her."

"Then I just don't understand. Could you make me see? Why do you fight?"

Meistersinger the warlord thought for a long time. When he at last sang, it was in a mournful minor key.

"Of all the things in this life, that is the one I would most like to ask Gaea. That we must all die and return to mud—I have no objections, no bitterness. That the world is a circle and winds blow when Gaea breathes—these are things I understand. That there are times when one must go hungry, or when the mighty Ophion is swallowed in dust, or the cold wind from the west freezes us—these things I accept, as I doubt I could do a better job with these matters. Gaea has many lands to tend, and at times must turn her gaze elsewhere.

"When the great pillars of the sky snap, such that the ground trembles and one fears the world will come apart and fling herself into the void, I do not complain.

"But at the time of Gaea's breath, when the hate is upon me, I reason no more. I lead my people into battle, knowing not that my own hinddaughter falls at my side. *I knew it not.* She was a stranger to me because the sky was filled with angels and it was time to fight. It is only later when the rage lifts from us that we count the cost. It is then the mother finds his child slain on the field. It was then I found the daughter of my flesh wounded by angels but trampled by the feet of her own people.

"This was five breaths ago. My heart grew sick, and I fear it will never heal."

Cirocco dared not break the silence as Meistersinger turned from her. He stood and walked to the door, faced the night while Cirocco watched the candle flicker on the table. He made sounds that were certainly the sounds of weeping, though they did not sound like human weeping. After a time, he came back to her and sat, looking very tired.

"We fight when the rage takes us. We do not stop fighting until the angels are all dead or gone back to their home."

"I wish that I might show you the ways we have learned. Sometimes, on Earth, both parties are too hostile to sit down and talk. In that case, we use a third party to sit between the enemies. Our weapons have grown so fearsome that no one has used them in a long time. We have become better at peace, and I offer as proof the fact that while having been able to destroy our

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entire planet for at least . . . make it sixty myriarevs, we have not done so."

Meistersinger nodded gravely.

"It is up to you," Cirocco said. "Our kind can offer you more war, or the possibility of peace." She decided to shut up. Meistersinger knew it was within his power to learn of the weaponry Gene offered to give.

The candle in the wall holder guttered to darkness; only the one between them survived to cast dancing light across his feminine features.

"Where could I find this one to stand in the middle?"

Cirocco spread her hands. "I am willing to offer my services as an authorized representative of the United Nations. I'm going through the territory of the angels anyway, on my way to see Gaea. And I hate war."

For the first time Meistersinger looked impressed. It was plain that his opinion of her had gone up significantly.

"You did not say you were a pilgrim. This puts a new light on matters. I fear you are a fool, but it is a holy foolishness." He reached across the table and took her head in his big hands, leaned over, and kissed her forehead. It was the most ritualistic thing she had seen a titanide do, and it touched her.

"Go, then," he said. "I will think no more of new weapons. Things are fearsome enough, without taking a road that must lead to destruction."

He paused, seeming to draw in on himself.

"If by some happenstance you should actually see Gaea, I wish you would ask her for me why my hind-daughter had to die. If she will not answer you, slap her face and tell her it's from Meistersinger."

"I'll do that." She got up, strangely exhilarated, somehow less worried about the future than she had been in two months. She started to leave, but was curious about something.

"What was the kiss for?" she asked.

He looked up.

"It was the kiss for the dead. When you leave, I will never see you again."

CHAPTER FOURTEEN

Hornpipe had assumed the role of guide and source of information for the human party. She said her hind-mother approved, and felt it would be a good learning experience. The humans were the most exciting things to happen in Titantown for many a myriarev.

When Cirocco expressed a desire to see the place of winds outside town, Hornpipe packed a picnic lunch and two full wineskins. Calvin and Gaby volunteered to go, but August just sat looking out the window, something she did often. Gene could not be found. Cirocco reminded Calvin he had pledged to stay with Bill.

Bill told her to wait until he was healed. She was forced to remind him that she was still in charge. He had been forgetting that, as confinement made him peevish and petty. Cirocco

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understood that, but liked him least when he turned protective.

"Nice day for a picnic," Hornpipe sang as Cirocco and Gaby joined her on the edge of town. "The ground is dry. We should make it there and back in four or five revs."

Cirocco knelt and tied the shoelaces of the soft leather moccasins that titanides had made for her, then stood and looked out over the brown land to where the west central Rhea cable—the place of winds—loomed in the clear air.

"I hate to disappoint you," she sang, "but it will take me and my friend a decarev to get there, and the same coming back. We plan to camp at the base and take the false death."

Hornpipe shivered. "I wish you would not do that. It frightens me. How do the worms know not to eat you?"

Cirocco laughed. The titanides did not sleep, ever. They found it even more disturbing than the odd knack of balancing forever on two legs.

"There's an alternative. I hesitate to suggest it for fear of offending you. On Earth we have animals—not people—that are built something like you. We ride upon their backs."

"On their backs?" She looked puzzled, then her face lit up as she made the connection. "You mean with one of your legs on each . . . of course, I see! Do you think it would work?"

"I'm willing to try it if you are. Hold out your hand. No, turn it . . . that's it. I'm going to put my foot on it . . ." She did so, grabbed Hornpipe's shoulder, and swung herself up and over. She sat on the broad back with a cinch strap under her and a saddlebag behind each leg. "Is that comfortable?"

"I hardly know you're there. But how will you stay on?"

"That's what we'll have to see. I thought I'd—" She broke off with a high-pitched yelp. Hornpipe had turned her head all the way around.

"What's wrong?"

"Nothing. We're not so limber as that. I can hardly believe you're doing it. Never mind. Turn around and watch where you're going, and start out slow."

"What gait would you prefer?"

"Huh? Oh. I don't know anything about it."

"All right. I'll trot first, and work up to a slow gallop."

"Do you mind if I put my arms around you?"

"Not at all."

Hornpipe made a wide circle, gradually increasing her speed. They raced by Gaby, who cheered and shouted. When Hornpipe trotted to a stop she was scarcely breathing hard.

"Will it work, do you think?" Cirocco asked.

"I should think so. Let's try it with both of you."

"I'd like something to cover this strap," Cirocco said. "As for Gaby, why don't we find someone else for her?"

Within ten minutes Hornpipe had two cushions and another volunteer. This one was male, and covered in

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lavender fur, with white head and tail hair.

"Hey, Rocky. I've got a fancier mount than you."

"Depends on how you look at it. Gaby, I'd like you to meet—" she sang the name, reversed the introduction, then whispered an aside to Gaby. "Call him Panpipe."

"What's wrong with Leo or George?" she groused, but shook hands with him and easily leaped astride.

They set out, the titanides singing a traveling song that the women joined as best they could. When that one ended they learned another. Then Cirocco eased into "The Wonderful Wizard of Oz," following it up with "The Caissons Go Rolling Along," and "Off We Go, Into the Wild Blue Yonder." The titanides were delighted; they had not known the humans had songs.

Cirocco had been on a raft trip down the Colorado River, and in a nutshell boat on the Ophion. She'd flown over the south pole and hopped across the United States in a biplane. She had traveled by snowmobile and bicycle, cable car and gravity train, and once took a short trip on a camel. None of them were anything like riding a titanide under the vault of Gaea, in that long afternoon forever on the verge of sunset. Ahead of her a stairway to heaven sprang from the ground and retreated into night.

She threw back her head and sang.

"It's a long way to Tipperary, it's a long way to go . . ."

The place of winds was hard rock and tortured earth.

Ridges like gnarled knuckles began to wrinkle the brown land, and between them deep chasms opened. The ridges splayed out and became fingers that gripped the land and crumpled it like a sheet of paper. The fingers soon joined a weathered hand and then a long shaggy arm reaching out of the night.

The air was never still. Sudden gusts from every direction generated a thousand dust devils to dance erratically in their path.

Soon they heard the howling. It was a hollow sound, not pleasant, but with none of the terrible sadness of the great wind from Oceanus known as Gaea's Lament.

Hornpipe had given them some idea of what to expect. The ridges they were climbing were cable strands emerging at a thirty degree angle to the ground, and covered with soil. The wind had eroded the land into gullies that all ran toward the source of the sound.

They began to pass suction holes in the ground, some no bigger than half a meter across, others large enough to swallow a titanide. Each had its own distinctive whistling note. It was a nonharmonic, nonquantized music, like some of the more opaque experiments from the turn of the century. Behind it all was a continuous organ note.

The titanides picked their way up the last, long ridge. It was hard, rocky

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ground, long since scoured of loose dirt, but the spine of the ridge was narrow and the chasms were wide and deep. Cirocco hoped they would know when it was best to stop. Already the wind whipped tears from her eyes.

"This is the place of winds," Hornpipe sang. "We dare not approach any closer, as the winds become strong enough to carry you away. But you can see the Great Howler if you go down the slope. Would you like me to carry you there?"

"Thanks, I'll walk." Cirocco said, and swung to the ground.

"I'll show the way." Hornpipe started down the slope, taking short, mincing steps and looking unstable, but apparently having no trouble.

The titanides came to a vertical drop and followed it to the east. When Gaby and Cirocco reached it they felt an increase in both the wind and the noise.

"If it gets much worse than this," Cirocco shouted, "I think we'd better give it up."

"I'm with you."

But when they reached the place the titanides had stopped, they saw it was as far as they would need to go.

There were seven visible suction holes, all of them at the ends of long, steep ravines. Six were from fifty to two hundred meters across. The Great Howler could have swallowed them all.

Cirocco guessed it was a kilometer from the base of the opening to its top, and half that across its widest point. The oval shape was enforced by its position between two cable strands that made a sharp V as they emerged from the brown land. Where they met, the great mouth of bare stone gaped open.

The sides of the opening were so smooth they flashed in the sunlight, like contorted mirrors. They had been polished by a thousand years of wind and the abrasive sand it carried. Veins of lighter ore in the dark stone gave it a mother-of-pearl sheen.

Cirocco touched Hornpipe's rump and gestured back to the top of the ridge. She wondered what they thought of this place. Awe? Not likely. It was just outside of town. Were the Swiss awed by mountains?

It was good to get back to relative quiet. She stood beside Hornpipe and surveyed her surroundings.

If the cable base was a giant hand, as she had seen it earlier, they had made it to the second knuckle of one of the fingers. The Howler was down in the webbing between two fingers.

"Is there another way up?" Cirocco sang. "A way to reach the broad plain up there, without being sucked up to Gaea?"

Panpipe, who was a little older than Hornpipe, nodded.

"Yes, many. This great mother of holes is the largest. Any of the other ridges will allow you to reach the plateau."

"Then why didn't you take me up there?"

Hornpipe looked surprised. "You said you wished to see the place of winds, not climb up to meet Gaea."

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"My fault," she acknowledged. "But what is the best way to the top?"

"The very top?" Hornpipe sang, wide-eyed. "I was merely joking. Surely you will not go there?"

"I'm going to try."

Hornpipe pointed to the next ridge to the south. Cirocco studied the land across the chasm. It looked no more difficult than the ridge they had climbed. That had taken the titanides an hour and a half, so she should be able to walk it in six to eight hours. There was another six hours of uphill terrain until the plateau was reached, and beyond that . . .

From this vantage point the slanted cable was a preposterous mountain. It sloped away from her for approximately fifty kilometers, to the darkness above the Rhea border. For three of those kilometers nothing grew; it was chocolate brown dirt and gray rock. For a similar distance there were only twisted, leafless trees. Beyond that, the persistent life of Gaea had found a foothold. She could not tell if it was grass or woodlands, but the five-kilometer diameter barrel of the cable was crusted in green—the corroded anchor chain of a sea-going vessel.

The green extended to the Rhea twilight zone. The zone was not a sharp-edged thing; it began gradually as the color was washed away by darkness. Green faded to bronze, deepened to dark gold, to silver over blood red, and finally to the color of clouds with the moon behind them. By then the cable was all but invisible. The eye followed the impossible curve as it dwindled to a rope, a string, a thread, before joining the looming darkness of the roof and vanishing into the spoke opening. The spoke could be seen to constrict gradually, but it was too dark to see much beyond that.

"It can be done," she said to Gaby. "To the roof, at least. I was hoping there would be some sort of mechanical lift here at the bottom. There might still be, I guess, but if we searched for it . . ." She waved her hand at the corrugated land. "It could take months."

Gaby studied the slope of the cable, sighed, and shook her head slowly.

"I go where you go, but you're crazy, you know? We'll never get past the roof. Take a look, will you? From there on in, we'd be climbing on the *bottom* of a forty-five degree slope."

"Mountaineers do it all the time. You did it, in training."

"Sure. For ten meters. We'll have to do it for fifty or sixty kilometers. And then—here's the good news—*then* we only have to go straight up. For four hundred kilometers."

"It won't be easy. We've got to try."

"*Madre de Dios.*" Gaby hit her forehead with the heel of her hand, and rolled her eyes.

Hornpipe had watched Cirocco's gestures as she outlined the problem. Now she sang, *largo.*

"You will climb the great stairs?"

"I must."

Hornpipe nodded, then bent and kissed Cirocco's forehead.

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"I wish you folks would stop doing that," Cirocco said, in English.

"What was it for?" Gaby asked.

"Never mind. Let's get back to town."

They stopped after leaving the zone of wind. Hornpipe put out a groundcloth and they sat down to a picnic. The food was hot, stored in nutshell thermos bottles. Cirocco and Gaby ate perhaps a tenth of it between them, and the titanides wolfed down the rest.

They were still five kilometers from Titantown when Hornpipe looked over her shoulder, the expression on her face a mixture of mournfulness and anticipation. She gazed at the dark roof.

"Gaea breathes," she sang, sadly.

"What? Are you sure? I thought it would be noisy, and we'd have plenty of time to—does that mean there'll be angels?"

"Noisy from the *west*," Hornpipe corrected her. "The breath of Gaea is silent from the east. I fancy I can hear them already." She missed a step, nearly throwing Cirocco.

"Well, hurry, damn it! If you're trapped out here alone you won't have a chance."

"It's too late," Hornpipe sang, and now her eyes yearned, her lips drew back to bare bright teeth.

"*Move*!" Cirocco had practiced that tone of command for years, and somehow managed to put it in a titanide song. Hornpipe leaped to a gallop, and Panpipe followed close behind.

Soon even Cirocco could hear the wail of angels. Hornpipe's gait wavered; she wanted very badly to turn back and do battle.

They were approaching a lone tree, and Cirocco made a snap decision.

"Pull up. Hurry, we don't have much time."

They halted under the spreading branches and Cirocco jumped down. Hornpipe tried to bolt but Cirocco slapped the titanide's face, which seemed to calm her temporarily.

"Gaby, cut off those saddlebags. Panpipe! Stop that! Come back here at once."

Panpipe looked undecided, but came back to them. Gaby and Cirocco worked frantically, tearing their clothes into strips, each making three strong ropes.

"My friends," Cirocco sang, when she had the tethers. "I don't have time to explain. I ask you to trust me and do as I say." She put every ounce of determination she possessed into the song, scoring it in the mode used from the old and wise to the young and foolish. It worked, but just barely. Both titanides kept looking to the east.

She had them lie on their sides.

"That hurts," Hornpipe complained when Cirocco tied her hind legs together.

"I'm sorry. It's for your own good." She quickly bound her forelegs and arms, then tossed a wineskin to Gaby. "Get as much of this down him as you can. I want him too stinking drunk to move."

"Gotcha."

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"My child, I want you to drink this," she sang. "You too, over there. Drink *lots* of it." She held the nipple to Hornpipe's lips. The sound of the angels was louder now. Hornpipe's ears twitched up and down rapidly.

"Cotton, cotton," she muttered. She tore strips from her already frayed tunic and rolled them into tight balls. "It worked for Odyssus, maybe it'll work for me. Gaby, the ears, Plug his ears."

"That *hurts*," Hornpipe howled. "Let me *up*, Earth monster. I don't *like* this game." She began to moan, the notes only occasionally resolving into words of hate.

"Have some more wine," Cirocco crooned. The titanide choked as she poured it down her throat. The cries of the angels were very loud now. Hornpipe began to screech in reply. Cirocco grabbed the titanide's ears and squeezed them, then cradled the big head in her lap. She put her lips to one ear and sang a titanide lullaby.

"Rocky, help!" Gaby yelled. "I don't know any of those songs. Sing louder!" Panpipe was struggling, shrieking as Gaby tried to hold him by the ears. He lashed out with his bound hands and threw her away from him.

"Grab him! Don't let him get away."

"I'm *trying*." She ran behind him and tried to pin his arms to his sides, but he was much too strong for her. She tumbled away again, got up with a cut over her right eye.

Panpipe was gnawing at the bonds that held his wrists together. The cloth tore and he was clawing at his ears.

"What now, Rocky?" Gaby screamed, desperately.

"Come help me," she said. "He'll kill you if you get in his way." It was far too late to stop Panpipe. His front legs were free and he was contorted like a snake, tearing at the strap that bound the other two.

Without a glance at the women and Hornpipe, he charged toward Titantown. Soon he was gone over the top of a low hill.

Gaby did not seem aware that she was crying as she knelt beside Cirocco, nor did she do anything about the trickle of blood down the side of her face.

"How can I help?"

"I don't *know*. Touch her, sooth her, do anything you can think of to keep her mind off angels."

Hornpipe was thrashing now, her teeth clenched, face bloodless. Cirocco held on, getting as close as she dared while Gaby slipped a rope around the titanide's chest, pinioning her arms at her side.

"Hush, hush," Cirocco whispered. "There's nothing to be afraid of. I'll watch over you until your hindmother returns. I'll sing you her songs."

Hornpipe gradually quieted, her eyes regaining the intelligence Cirocco had seen on the first day they met. It was infinitely better than the fearsome animal she had become.

It was ten more minutes before the last of the angels went by overhead. Hornpipe was drenched in sweat, like someone kicking a heroin or alcohol

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addiction.

It turned out to be not nearly so difficult when the angels returned on their way home. They never gave Hornpipe a chance to hear them and while she sweated and shook as if she could somehow feel them, she never struggled very hard.

And then they were gone, back to the eternal darkness of the spoke high above Rhea.

She cried when they released her; the helpless sobs of a child who doesn't understand what has happened to her. That turned into petulance and complaints, chiefly about her sore legs and ears. Gaby and Cirocco rubbed her legs where the ropes had chafed. Her cloven hooves were as clear and red as cherry Jello.

She seemed confused as to the whereabouts of Panpipe, but not distressed when she understood he had gone into battle.

When she got to her feet she was too drunk to carry them. They walked her in circles and finally headed her back toward town. In a few hours they could get on her back again.

Titantown was in sight before they found Panpipe.

The blood had already dried in his pretty blue fur. A lance stuck out from his side, pointed at the sky. He had been mutilated.

Hornpipe knelt at his side and wept while Gaby and Cirocco hung back. There was bitterness in Cirocco's mouth. Did Hornpipe blame her? Would she have preferred to have died with him, or was that a hopelessly Earthling notion? The titanides didn't seem to understand the glory of battle; it was something they did because they couldn't help it. Cirocco admired them for the first, pitied them for the second.

Do you rejoice for the one you saved, or weep for the one you lost? She could not do both, so she wept.

Hornpipe struggled to her feet, much heavier than she had been. Three years old, Cirocco thought. It meant nothing. She had some of the innocence of a human of the same age, but she was a titanide adult.

She picked up the severed head and kissed it once, then set it down by the body. She sang nothing; the titanides had no song for this moment.

Gaby and Cirocco got on her back again, and Hornpipe set out for town at a slow trot.

"Tomorrow," Cirocco said. "We leave for the hub tomorrow."

CHAPTER FIFTEEN

Five days later, Cirocco was still preparing to depart. There was the problem of who and what to take.

Bill was out, though he had other opinions. So was August. She spoke seldom now, spending her time on the edge of town, answering questions in monosyllables. Calvin could not say if the best therapy would be to leave her or take her with them. Cirocco had to decide in favor of the mission, which would be in trouble if August suffered a breakdown.

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Calvin was out because he had promised to stay in Titantown until Bill was well enough to care for himself; after that, he was on his own.

Gene was out. Cirocco did not trust him, could not chance taking him on a journey where she would have to rely on him. She asked Calvin to watch him, and tried not to worry.

That left Gaby.

"You can't leave me," she said, not pleading, merely stating a fact of life. "I'll follow you."

"I won't try to. You're a pest with this fixation you have on me that I don't deserve. But you saved my life, which I've never really thanked you for, and I want you to know I'll never forget it."

"I don't want your thanks," Gaby said. "I want your love."

"I can't give it to you. I *like* you, Gaby. Hell, we've been side by side since this thing started. But we're doing the first fifty kilometers in Whistlestop. I won't force you to get on."

Gaby paled, but spoke up bravely. "You won't have to."

Cirocco nodded. "As I say, it's up to you. Calvin says we can get to the level of the twilight zone. The blimps don't go any higher than that, because the angels don't like it."

They needed many things and Cirocco did not know how to obtain them. The titanides had a system of exchange, but prices were established by a complex formula involving degrees of relationship, standing in the community, and need. No one went hungry, but low-status individuals like Hornpipe had little but meals, shelter, and the bare necessities of body ornamentation. The titanides viewed these as only slightly less vital than food.

There was a credit system, and Meistersinger used some of his, but relied mostly on pegging Cirocco's status arbitrarily high, claiming her as his spiritual hinddaughter and making a case that she should be adopted as such by the community because of the nature of her mission.

Most of the titanide artisans bought the idea, and were almost too helpful in outfitting the party. Backpacks were made with straps arranged for human bodies. Then everyone came offering his or her finest wares.

Cirocco had decided they could each carry around fifty kilos of mass. It bulked large, but weighed only twelve kilos and would get lighter as they climbed toward the hub. The centripetal acceleration there would be one fortieth of a gravity.

Rope was the first consideration. The titanides had a plant that grew fine rope, strong, thin, and supple. Each human could carry a hundred meter coil of it.

The titanides were good climbers, though they largely confined their efforts to trees. Cirocco discussed pitons with the ironworkers, who came back with their best efforts. Unfortunately, steel was news to the titanides. Bill looked at the pitons and shook his head.

"It's the best they can do," Cirocco

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said. "They tempered it, like I told them."

"It's still not enough. But don't worry. Whatever the insides of the spoke is, it won't be rock. Rock could never stand up to the pressures trying to tear this place apart. In fact, I don't know of anything strong enough."

"Which just means the people who built Gaea knew things we don't know."

Cirocco was not too disturbed. The angels lived in the spokes. Unless they existed by flying all their lives, they had to perch somewhere. If they could perch on something, she could cling to it too, she thought.

They brought hammers to drive the pitons, the lightest and hardest the titanides could make. The metalworkers provided them with hatchets and knives, and whetstones to sharpen them. They each packed a parachute, courtesy of Whistlestop.

"Clothes," Cirocco said. "What kind of clothes should we bring?"

Meistersinger looked helpless.

"I have no need of them, as you can see," he sang. "Some of our people who are naked-skinned, as you are, wear them in the cold times. We can make what you want."

So they were outfitted in the finest patterned silks from head to toe. It was not actually silk, but felt just like it. Over that were felt shirts and pants, two sets for each of them, and woven sweaters for upper and lower parts of the body. Fur coats and pants were made, and fur-lined gloves and hard-soled moccasins. They had to go prepared for anything, and though the clothing took a lot of space, Cirocco didn't begrudge it.

They packed silk hammocks and sleeping bags. The titanides had matches, and oil-burning lamps. They took one each, and a small supply of fuel. There was no way it would stretch for the whole journey, but neither would their food or water.

"Water," Cirocco fretted. "That could be a big problem."

"Well, like you said, the angels live up there," said Gaby while helping with the packing on the fifth day of preparations. "They must drink something."

"That doesn't mean waterholes will be easy to find."

"If you're going to be all the time worrying, we might as well not go."

They took waterskins good for about nine or ten days, and then filled out the mass limit with as much dried food as would fit. They planned to eat what the angels ate, if that was possible.

On the sixth day everything was ready, and she still had to face Bill. She was glum about the possibility of having to use her authority to end the argument, but knew she would do so if it came to it.

"You're crazy," Bill said, hitting his palm on the bed. "You have no idea what you'll find up there. Do you seriously think you can climb up a chimney *four hundred kilometers high?*"

"We're going to see if it's possible," said Cirocco.

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"You're gonna get yourselves killed. You ought to be doing a thousand klicks when you hit."

"I figure terminal velocity in this air couldn't be much over two hundred. Bill, if you're trying to cheer me up, you're doing a lousy job." She had never seen him like this, and she hated it.

"We should all stick together, and you know it. You're still overcompensating because you lost *Ringmaster*, trying to act the hero."

If there hadn't been a grain of truth in what he said, it couldn't have hurt so much. She had thought about it for long hours while trying to sleep.

"Air! What if there's no air up there?"

"We're not going to commit suicide. If it's impossible, we'll accept it. You're manufacturing arguments."

His eyes pleaded with her.

"I'm asking you, Rocky. Wait for me. I have never asked anything before, but I'm asking for this now."

She sighed, and gestured for Gaby to leave the room. When she had gone Cirocco sat on the edge of his bed and reached for his hand. He moved it away. She stood up quickly, furious at herself for trying to reach him that way, and at him for rejecting her.

"I don't seem to know you, Bill," she said, quietly. "I thought I did. You've been a comfort to me when I was lonely, and I thought I might love you in time. I don't fall in love easily. Maybe I'm too suspicious; I don't know. Sooner or later everybody demands that I be what they want me to be, and now you're doing it."

He said nothing, did not even look at her.

"What you're doing is so unfair I could scream."

"I wish you would."

"Why? So I'd fit your picture of what a woman's supposed to do? Damn it, I was a captain when you met me; I didn't think that was so important to you."

"I don't know what you're talking about."

"I'm talking about the fact that if I leave here now, it's all over between us. Because I won't wait for you to come along to keep me safe."

"I don't know what you're—"

She did scream then, and it felt good. She could even manage a bitter laugh when it was over. It had startled Bill. Gaby stuck her head in the door, then vanished when Cirocco did not acknowledge her presence.

"Okay, okay," she said. "I'm overreacting. It's because I lost my ship and have to make up for it by covering myself with glory. I'm frustrated because I haven't been able to put this crew back together and get it functioning, even to the extent of having the one man I thought I could depend on respect my decisions, shut up, and do what he's told. I am one odd critter; I know that. Maybe I'm too aware of things that would be different if I was a man. You *get* sensitive when you see it happen over and over on your way up, and you have to be twice as good to get the job.

"You disagree with my decision to

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go up. You have stated your objections. You said you loved me. I don't think you do any more, and I'm very sorry things turned out this way. But I order you to wait here until I return, and say no more to me about it."

His mouth was set in an uncompromising line.

"It's because I love you that I don't want you to go," he replied.

"My God, Bill, I don't want that kind of love. 'I love you, so hold still while I tie you down.' What hurts is that it's you doing it. If you can't have me as my own woman, able to make my own decisions and take care of myself, you can't have me at all."

"What kind of love is that?"

She felt like crying, but knew she didn't care.

"I wish I knew. Maybe there's no such thing. Maybe one has to be taken care of by the other, which means I'd better start looking for a man who'll be dependent on me because I won't have it the other way. Can't we just care for each other? I mean, when you're weak I help out, and when I'm weak you support me."

"It looks like you're never weak. You just said you can take care of yourself."

"Any human being should. But if you think I'm not weak, you don't know me. I'm like a little baby right now, wondering if you're going to let me leave here without a kiss, without even wishing me good luck."

Damn it, there went a tear. She wiped at it quickly, not wanting him to accuse her of using tears as a weapon. How do I get in these no-win situations? she wondered. Strong or weak, she would always be on the defensive about it.

He relented enough for a kiss. There seemed little to say when they moved apart. Cirocco could not tell what his reaction was to her dry eyes. She knew he was hurt, but did that hurt him more?

"You come back as soon as you can."

"I will. Don't worry too much about me. I'm too mean to kill."

"Don't I know it."

Cirocco stayed with Gaby as she succumbed to a screaming fit, feeding her wine until she was on the verge of unconsciousness. When she was sure Gaby would be all right, she joined Calvin at the front of the gondola.

They were in the air. Water ballast was still spilling from a hole near Whistlestop's nose.

Soon they were skimming the upper surface of the cable. Looking down, Cirocco saw trees and areas of grass. Parts of the cable were completely overgrown. The thing was so large that it looked almost like a flat strip of land. There would be no danger of falling until they reached the roof.

The light slowly began to fail. In ten minutes they were in orange-tinted dusk, heading for eternal night. Cirocco was sad to see the light go. She had cursed it for being so unvarying, but at least it was light. She would not see it again for some time.

She might not ever see it again.

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"This is the end of the line," Calvin said. "He'll bring you in a little lower and put you down by the cable. Good luck, you crazy fools. I'll be waiting for you."

Cirocco helped Gaby into her harness, then went first to hold her when she reached the ground. Calvin would see that Gaby got out safely. She settled her own harness around her hips and let her feet drop over the edge.

She descended into the twilight zone.

CHAPTER SIXTEEN

They felt lighter when they landed on the cable, being about one hundred kilometers nearer the center of Gaea—and one hundred long kilometers from her floor. The gravity had dropped from almost one-quarter gee to less than a fifth. Cirocco's pack weighed nearly two kilos less, and her body weight had decreased by two and a half.

"It's a hundred kilometers to where the cable joins the roof," Cirocco said. "I'd say it's a thirty-five degree slope here. It should be easy enough for now."

Gaby looked skeptical.

"More like forty degrees, I'd say. Closer to forty-five. And it gets steeper. Say sixty degrees before we reach the level of the roof."

"But in this gravity—"

"Don't laugh at a forty degree slope," Gaby said. She was sitting on the ground, looking green but cheerful. She had thrown up, but said anything was better than being in the blimp. "I've done some climbing on Earth with a telescope strapped to my back. You've got to be in good shape, and we're not."

"Hell, we set out on the longest mountain climb ever attempted by human beings; do I hear singing? No, nothing but grousing."

"If there's songs to be sung," Gaby said, "we'd better sing'em now. We ain't gonna feel like it later."

Well, Cirocco thought, I tried. She was aware the trip was going to be hard, but felt the hard part would not begin until they reached the roof, which she thought they could do in five days.

They were in a dim forest. Trees of cloudy glass loomed over them, further filtering what light reached the twilight zone, giving everything a bronze hue. Shadows were conical and impenetrable, pointing the way east, toward night. A canopy of pink, orange, blue-green, and gold cellophane leaves arched overhead: an extravagant sunset late in a summer evening.

The ground vibrated softly beneath their feet. Cirocco thought about the huge volumes of air rushing through the cable on its way to the hub, and wished there was some way of putting that immense power to use.

It was not difficult climbing. The ground was hard, smooth, packed dirt. The shape of the land was dictated by the winding of the strands under the thin layer of soil. It humped in long ridges that, after a few hundred me-

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ters, could be seen angling toward the sloping sides of the cable.

The vegetation grew most thickly where the dirt was deepest, between the strands. They adopted the tactic of following a ridge until it began to curl under the cable, then crossing a shallow gully to the next strand to the south. That would be good for another half kilometer, then they would cross again.

Each gully had a small stream at the bottom. None held more than a trickle, but the water flowed swiftly and cut deep channels in the dirt, all the way down to the cable. Cirocco guessed the streams must fall right off the cable somewhere to the southwest.

Gaea was as prolific up here as she was on the ground. Many of the trees bore fruit, and they were alive with arboreal animals. Cirocco recognized a sluggish, rabbit-sized creature that was edible and easy to kill.

By the end of the second hour Cirocco realized Gaby had been right. She knew it when a cramp seized her calf and sent her sprawling on the warm ground.

"Don't say it, dammit."

Gaby grinned. She was sympathetic, but still pleased with herself.

"It's the slope. It doesn't feel all that hard to go up it; you're right about the weight. But it's so steep you have to do it on your toes."

"Maybe we'd do better on all fours," Cirocco said. "We're making our thighs and the backs of our legs do too much of the work. We should spread it out some."

"It would help us get in shape for the straight-up part," Gaby said. "That's going to be mostly arm work."

"Would you get that medical kit out of my pack?"

There were various remedies for sniffles and fevers, vials of disinfectant, bandages, a supply of topical anesthetic, even a bag of berries that worked as a stimulant. Cirocco had tried them. There was a first aid booklet Calvin had written that told how to deal with problems from a bloody nose to an amputation. And there was a round jar of violet salve Meistersinger had given her for "the pains of the road." She rolled up her pants leg and rubbed some on, hoping it would work as well for humans as it did for titanides.

"Ready?" Gaby was up, adjusting her pack.

"I think so. We're going to stop in twenty minutes, rest for ten."

"You got it."

Cirocco's next cramp came during the following rest period. Cramps, actually, as both legs were involved this time. There was nothing funny about it.

"Hey, Rocky," Gaby said, touching her shoulder hesitantly. "There's no sense killing ourselves. Let's take an hour this time."

"This is *ridiculous*," Cirocco managed to grunt. "I'm barely winded. It just doesn't feel right to sit on my butt." She looked at Gaby suspicious-

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ly. "How come *you* don't get cramps?"

"I'm slacking," Gaby admitted, with a straight face. "I hitch a rope to that butt you don't want to sit on, and let you do the donkey work."

Cirocco had to laugh, though weakly.

"I'll just have to live with it," she said. "Sooner or later I'll be in better shape. Cramps won't kill me."

"No. I just hate to see you hurt. How about ten up, twenty down? Just until we start to work ourselves into something more."

"No. We go up for fifteen minutes, or until I can't go on, whichever is sooner. Then we rest the same time, or until we're both able to climb. We do that for eight hours . . ." She checked her watch. "That's a little more than five hours from now. Then we make camp."

Gaby sighed. "Lead on, Rocky. That's what you're good at."

It was gruesome. Cirocco continued to have the greatest share of pains, though Gaby began to experience them, too.

The titanide salve helped, but they had to use it sparingly. They both packed a medical kit, but they had already gone through Cirocco's supply. She hoped they would not be needing it past the first few days of the journey, but wanted to retain one jar for the climb up the inside of the spoke. After all, it was not unbearable pain. When it grabbed her she was likely to yelp, then sit down and wait for it to pass.

At the end of the seventh hour she relented, feeling a little chagrined at her own stubbornness. It was almost as if she had been trying to prove Bill was right, forcing herself to be tough, to go to the limits of her endurance and then a little beyond.

They made camp at the bottom of a gully, gathering wood for a fire but not bothering to set up their tents. The air was hot and muggy, but the fire was a welcome light in the increasing gloom. They sat around it at a comfortable distance, stripped down to their gaudy silken underclothes.

"How far do you think we've come, Rocky?"

"It's hard to say. Fifteen kilometers?"

Gaby did not seem inclined to dispute it. Cirocco sighed, and stretched out on the ground. "Fifteen today, twenty tomorrow. We'll be at the roof in five days," she said and watched the shifting colors of the leaves overhead. "Gaby dig into that sack and rustle us up some grub. I could eat a titanide."

They did not make twenty kilometers the next day; they did not make ten.

Cirocco was so stiff she could not bend her knees without wincing. They stumbled around fixing breakfast and breaking camp, moving like octogenarians, then forced themselves through a series of kneebends and isometrics.

"I know this pack is a few grams lighter," Gaby moaned, as she slung it

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on her back. "I ate two meals out of it."

"Bitch, bitch, bitch. You wanna live forever?"

"Live? This is living?"

The second night came only five hours after the first because Cirocco decided it had to.

"When you get the fire going, Rocky," Gaby sighed, stretching out on her sleeping bag, "I'll take about five of those steakplant fillets. In the meantime, walk softly, will you? When your knees crack you wake me up."

Cirocco put her hands on her hips.

"So that's how it's going to be, huh? I've got news for you. I outrank you."

Cirocco limped around until she had gathered enough wood for a fire. Kneeling to start it turned out to be a very complex problem, one she was not sure she could solve. It involved wrenching abused joints through angles they just did not want to take.

But after a time the steakplants were snapping in the grease, and Gaby followed her nose to the source of the heavenly aroma.

Cirocco had just enough strength to kick dirt over the coals and unroll her sleeping bag. She was asleep on her way down to it.

The third day was not as bad as the second, in the same way the Chicago Fire was not as bad as the San Francisco Earthquake.

They made ten kilometers over gradually steepening ground in just under eight hours. Gaby remarked at the end of it that she no longer felt eighty years old. She now felt seventy-eight.

It became necessary to use a new climbing tactic. The increasing slope of the ground made walking, even on all fours, more and more difficult. Their feet would slip and they would go down on their stomachs with arms and legs spread to prevent a backward slide.

Gaby suggested they alternately take one end of the rope and crawl up as far as it would reach, then tie the end to a tree. The other, waiting at the bottom, then had an easy hand-over-hand pull and walk. The one who went ahead worked hard for ten minutes while the other rested, then could rest for a turn before going again. They made three hundred meters at a time.

Cirocco looked at the stream near their third campsite and thought about taking a bath, then decided against it. Food was what she wanted.

She actually felt good enough to look through her pack and check the level of stored provisions before collapsing.

The fourth day they made twenty kilometers in ten hours.

The fifth day took them irrevocably into night. There was now only the ghostly light reflected by the day areas curving up on each side. It was not much, but it was enough.

The ground was noticeably steeper,

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with a thinner layer of dirt. Often they walked on the warm, bare strands, which provided surer traction. They began tying themselves together.

Even here the plant life of Gaea had not given up. Massive trees splayed roots flat to the cable, sending out runners that scrabbled into the surface and hung on tenaciously. The effort of wresting a living from such uninviting terrain had robbed them of beauty. They were gaunt and lonely, their trunks translucent with a pale inner light, their leaves the merest wisps of nothing. In places, the roots could be used as ladders.

At the end of the day they had come seventy kilometers in a straight line, and were fifty kilometers nearer the hub. The trees had thinned enough for them to see they had climbed above the level of the roof, well on their way into the narrowing wedge of space between the cable and the bell-shaped mouth of the Rhea spoke. They could look back and see Hyperion spread out below, as though they rode on a kite tied to a monster string tethered in the rocky knot called the place of winds.

And on the sixth day, they found the stairs.

CHAPTER SEVENTEEN

The stairway emerged from a great heap of sand and went straight as an arrow until it could no longer be seen. Each step was a meter and a half wide and forty centimeters high, and appeared to have been carved into the face of the cable.

After Cirocco and Gaby had followed it for a time, they began to think it might actually do them little good. It was curving to the south, toward the drop-off. Before long it would surely be impassable.

But the steps remained perfectly level. Soon they were walking on a terraced shelf with a huge wall rising on one side and a sheer drop on the other. There was no handrail, no protection at all. They pressed close to the wall, and trembled with every gust of wind.

Then the shelf began to turn into a tunnel.

It was a gradual thing. There was still open space on the right, but the wall had begun to curl over their heads. The path was curving under the cable.

Cirocco tried to visualize it: always rising, but corkscrewing around the outside of the cable.

After another two thousand steps, they were in pitch blackness.

"Stairs," Gaby muttered. "They build a thing like this, and they put in stairs." They had stopped to get out their lamps. Gaby filled hers and trimmed the wick. They would burn one at a time and hope there was enough oil to get them out the other side.

"Maybe they were health nuts," Cirocco suggested. She struck a match and held it to the wick. "More likely this was an emergency measure, for a loss of power."

"Well, I'm glad they're here," Gaby admitted.

"They were probably here all the

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way but down lower they're covered with dirt. It means this place has been unattended for a long time. The trees up here must be new mutations."

"Whatever you say." Gaby held the lamp high and looked ahead, then back where she could still see a narrow wedge of light. Her eyes narrowed.

"Look, it's like we're at an angle in the road. It curves along the outside, then it cuts to the left and goes straight in."

Cirocco studied it, and thought Gaby was right.

"It looks like we might be cutting right through the center."

"Oh, yeah? Remember the place of winds? All that air is going through here, someplace."

"If this tunnel led to it, we'd know it already. It would have blown us right off the side."

Gaby looked at the ascending staircase in the flickering lamplight. She sniffed the air.

"It's pretty warm in here. I wonder if it gets hotter?"

"No way to know but by going in."

"Uh-huh." Gaby swayed and the lamp threatened to fall from her fingers. Cirocco put a hand on her shoulder.

"You all right?"

"I can make it."

"No," Cirocco decided. "I'm half-dead, myself. The question is do we camp here in the corridor where it's so hot, or go outside?"

Gaby looked back at the drop-off many steps behind them.

"I don't mind a little sweat."

There was something about having a fire, even when the weather was unbearably hot. They did not discuss it; Cirocco took small twigs and moss she had gathered below and started to build one. Soon she had a small blaze crackling. She fed it like a miser as they went about the mechanical business of setting a meager camp. Sleeping bags were unrolled, pans and knives brought out, provisions searched for the night's food.

We're a good team, Cirocco thought, hunkered down while she watched Gaby dice vegetables into the bubbling remains of last night's stew. Her hands were small and deft, with brown dirt ground into the palms. They could not spare water for washing.

Gaby wiped her brow with the back of her hand and glanced up at Cirocco. She smiled—a flickering, tentative thing that broadened when Cirocco smiled back. She dipped the spoon into the stew and slurped noisily.

"Those radish dinguses are best left crunchy," she said. "Give me your plate."

She ladled a generous helping and the two of them sat back, side by side but at arm's length, and ate.

It was delicious. Listening to the small sounds, the pop of the fire and the scraping of spoons on wooden plates, Cirocco was grateful to relax and think of nothing.

"Do you have any more salt?"

Cirocco dug in her pack and found

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the sack, and also two forgotten sweets, wrapped in yellow leaves. She pressed one into Gaby's hand and laughed when her eyes lit up. She put her own plate down and unwrapped the chewy, bite-sized confection, held it under her nose and sniffed. It smelled too good to eat all at once. She bit it in half, and the flavor of sugared apricots and sweet cream burst through her mouth.

Gaby was just short of hysterical at Cirocco's expression of delight. She ate the other half, then began casting covetous glances at the sweet Gaby had put at her side, while Gaby tried to keep a straight face.

"If you're keeping that for breakfast, you're going to have to stay awake all night."

"Oh, don't worry. I just have enough manners to know dessert is for *after* dinner."

She made the unwrapping last five minutes, then examined it critically for another five, sputtering helplessly at Cirocco's antics. Cirocco did a passable imitation of a cocker spaniel at the dinner table and a homeless waif looking in the window of the bakery, and gasped when Gaby finally put it in her mouth.

She was having so much fun that it hurt when she wondered—while sniffing eagerly with her face close to Gaby's—if the silliness was wise. Gaby was obviously in heaven with all the attention; her face was flushed with laughter and excitement, her eyes sparkled.

Why couldn't she just relax and enjoy the sweet simply?

She must have let some of her worry show, because Gaby was immediately serious. She touched Cirocco's hand and looked at her urgently, then slowly shook her head. Neither of them dared speak, but Gaby had told her more plainly than any words she might have said, "You have nothing to fear from me."

Cirocco smiled, and so did Gaby. They spooned up the last of the stew, holding the plates close to their mouths and not worrying about table manners.

But it was not quite the same. Gaby was silent. Soon her hands began to tremble, and the plate clattered to the steps. She sat up, grasping and sobbing, and Cirocco's hand on her shoulder brought her groping blindly. She drew her knees up and clenched her fists under her chin, buried her face under Cirocco's neck and wept.

"Oh, I hurt, I hurt so much."

"Then let it out. Cry." She put her cheek on the short, black hair, very fine and beginning to look tousled, then lifted Gaby's chin. She kissed her on the cheek.

Gaby looked at her for a long moment, sniffed loudly, and put her face back on Cirocco's shoulder. She burrowed into the hollow of her neck, then was still. No shakes, no sobs.

"Gaby, I'd be willing to make love to you if that would help stop the pain."

Gaby shook her head.

"That's not what I want from you. If you're 'willing,' that's no good. I'd

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rather keep the hurt than have you like that. It's enough to love you."

What to say, what to say? Stick to the truth, she told herself.

"I don't know if I'll ever love you back. Not that way. But so help me," she hugged Gaby and wiped quickly at her nose, "so help me, you're the best friend I ever had."

Gaby let out her breath with a soft sigh.

"That will have to do, for now." Cirocco thought she was going to cry again, but she didn't. She hugged Cirocco once, briefly.

"Life is very hard, isn't it?" Gaby said in a small voice.

"It is that. Let's get to bed."

They started out on three steps; Gaby stretched on the highest, Cirocco tossing and turning on the next, and the embers of the fire on the step below her.

But Cirocco cried out in the night and woke in utter darkness. Sweat was pouring from her body. She thought she was back in the beast. Gaby pulled her down and held her until the nightmare had passed.

"How long have you been here?" Cirocco said.

"Since I started to cry again. Thanks for letting me join you."

Liar. But she smiled when she thought it.

It grew hotter for a thousand steps, so hot that the walls could not be touched and the soles of their boots were burning. Cirocco tasted defeat, knowing there had to be at least several thousand more steps before they were in the middle, from which point they might expect it to cool again.

"One thousand more steps," she said. "If we can make it that far. If it's not cooler, we go back and try it on the outside." But she knew the cable was too steep now. The trees had become inconveniently far apart even before they entered the tunnel. The tilt of the cable would reach eighty degrees before they arrived at the spoke. She would be faced with her hypothetical glass mountain, the worst possibility she had imagined when preparing for the trip.

"Whatever you say. Just a minute, I want to take off this shirt. I'm smothering."

Cirocco stripped down, too, and they continued to hike through the furnace.

Five hundred steps later, they put their clothes back on. Three hundred steps beyond that, they opened their packs and got out their coats.

Ice began to form on the walls, and snow crunched underfoot. They donned gloves and pulled up the hoods on their parkas, then stood in lamplight which had become amazingly bright with the white walls to reflect it, watching ice crystals condense from their breaths and looking forward at a corridor that was unquestionably narrowing.

"A thousand more steps?" Gaby suggested.

"You must have read my mind."

The ice soon forced Cirocco to bend

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her head, then get on her hands and knees. It quickly grew dark again as Gaby led with the lamp in front of her. Cirocco paused and blew on her stiff hands, then got on her belly and crawled.

"Hey! I'm stuck!" She was pleased to hear no panic in her voice. It was frightening, but she knew she could get free if she backed up.

The scrabbling sounds in front of her stopped.

"Okay. I can't turn around here, but it's getting wider. I'll go ahead and see what it's like. Twenty meters. Okay?"

"Right." She listened to the sounds getting farther away. The darkness closed in and she had just enough time to work up a very cold sweat before the light dazzled her. In a moment Gaby was back. There were ice crystals on her eyebrows.

"This is the worst spot, right here."

"Then I'll get through. I didn't come this far to end up like a cork in a bottle."

"It's what you get for eating all those sweets, fatty."

Gaby could not pull her through, so she backed up and managed to get the brass pick from her pack. They chipped at the ice and tried it again.

"Breathe *out*," Gaby suggested, and tugged on her hands. She came through.

Behind them, a flat chunk of ice about a meter long fell from the roof and skidded noisily toward daylight.

"That must be why this passage is open," Gaby said. "The cable is flexible. It bends and the ice cracks."

"That and the warm air from behind us. Let's stop plugging it up, okay? Get moving."

Soon they could stand, and shortly afterward the ice was just a memory. They took off their coats and wondered what was next.

The rumbling began four hundred steps farther on. It grew louder until it was easy to imagine huge machines thrumming just beyond the walls of the tunnel. One of the walls was hot, but not anything like what they had already travelled through.

They felt sure it was the sound of the air being sucked from the place of winds toward some unknown destination high above. Two thousand more steps brought them beyond it and into another hot region. They hurried through it, not bothering to strip as they knew they were close to the far end of the tunnel. As expected, the heat diminished after reaching a sauna-bath peak that Cirocco estimated at seventy-five degrees.

Gaby was still in the lead, and saw the light first. It was no brighter than it had been on the other side, just a pale silver strip that began on their left and gradually widened until they were standing on a ledge beside the cable. They slapped each other on the back, then started climbing again.

They crossed over the top of the cable always rising, always trending to the south, over the broad hump and down again on the far side. The cable

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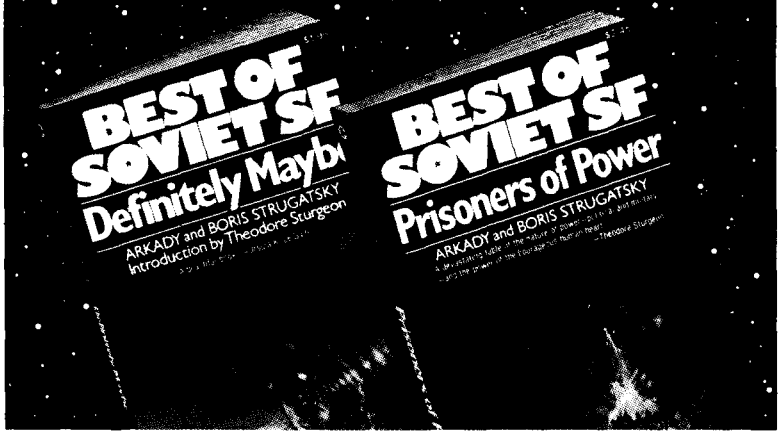

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was completely bare now; no trees, no earth clinging anywhere. It was the first time Gaea had really looked like the machine she knew it to be: the incredible, massive construct made by beings who might still be alive in the hub. The bare cable was smooth and straight, rising at an angle of sixty degrees now, getting closer to the flaring bottom edge of the spoke. The wedge of space between the cable and the spoke had narrowed to less than two kilometers.

On the south side the stairs entered another tunnel.

They made it through, went across the top, and down into the third tunnel. Through it, and across the top again.

They did that seven more times in two days. It would have been faster but for a delay in the fourth tunnel, which was so choked with ice even Gaby had to chip before she could squeeze through. It took them a frigid eight hours to break a path.

But the next time they reached the south side of the cable, there was no tunnel. The angle of rise was now between eighty and ninety degrees, and the staircase began to wind along the outside of it like the red strips on a peppermint stick.

Neither wanted to camp on a ledge a meter and a half wide that hung over a drop of two hundred and fifty kilometers. Cirocco knew she tossed in her sleep, and one toss could carry entirely too far. So, though both of them were weary, they kept trudging around and around the outside of the cable, always pressing their left shoulders to the reassuring solidity.

Cirocco did not like what was happening overhead. The nearer they got, the more impossible it looked.

They knew from their observations outside that each spoke was oval in cross-section, fifty kilometers thick one way and slightly less than a hundred the other, before it flared out to join the rim roof. They had just passed through that flaring section, and the spoke walls they could dimly see were nearly vertical. What they had not counted on was the lip that ran all the way around the monstrous bore of the spoke tube. It was easily five kilometers wide.

The cable seemed to enter the lip seamlessly, probably continuing above and travelling on to whatever tied it to the hub. During one of their rest stops they studied the lip, seemingly just above their heads, yet still two kilometers away. It was a massive ceiling to their labors, stretching endlessly until the opening became visible, narrowed by perspective. The opening was forty by eighty kilometers wide, but to reach it they would have to traverse five kilometers hanging from the underside of the lip.

Gaby looked at Cirocco and raised one eyebrow.

"Don't borrow trouble. Gaea's been good to us so far. Climb, my friend."

And Gaea was good to them again. When they got to the top of the cable there was another tunnel, this one piercing the vast gray roof.

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They lit the lamp, noting that there was not much fuel left, and began to climb. The tunnel curved to the left as if the cable was still there, though they could no longer be sure of it. They counted two thousand steps, then two thousand more.

"It occurs to me," Gaby said, "that this could go all the way to the hub. And if you think that's good news, you'd better think again."

"I know, I know. Keep climbing." Cirocco was thinking of lamp fuel, the state of their provisions, and the half-filled water skins. It was still three hundred kilometers to the hub. At three steps to the meter, that made it almost an even million steps yet to go. She looked at her watch and timed their pacing.

They had a rhythm of about two steps per second; just light touches of the toes to push them high enough to touch the next step. The gravity at that level had fallen to almost one eighth—half the already low gravity when they set out.

Two steps per second was half a million seconds of travel time. Eight three three three point three etc. minutes, one hundred thirty-eight hours, or nearly six days. Double that to include rest periods and sleep, at a conservative estimate . . .

"I know what you're thinking," Gaby said, from behind her. "But can we do it in the dark?"

She had hit on the important point. The food could last two weeks. The water might be enough with rationing, but not for coming down.

But the crucial consumable at this stage was lamp fuel. They had no more than a five hour supply, and no way to get more.

She was still working on it, trying to construct a mathematics that would get them to the top, when they emerged on the floor of the spoke.

Nothing had ever made Cirocco feel smaller. Not O'Neill One, not the stars in space, not the floor of Gaea herself. She could see everything, and her sense of perspective failed utterly.

It was impossible to detect the curvature of the walls. Like an upended horizon, they stretched away from her until suddenly they began to wrap around, making the space look more semicircular than round.

Everything was bathed in a pale green luminescence. The source of the light was four vertical rows of windows which sent beams slanting down to cross each other in the empty center.

Not quite empty. Running straight as a ruler through the central space were three vertical cables wound together like a braid, and drifting in and out of the light beams were odd, cylindrical clouds that twisted slowly as they watched.

Gaea had exhausted Cirocco's store of superlatives. She thought of a cathedral, knew it was hopelessly short of the truth.

"I thought I'd seen it all by now," Gaby said, quietly, pointing up at the wall behind them. "But a vertical

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jungle? Straight up—!"

There was no other way to describe it. Clinging to the walls, reaching outward or branching up, the inside of the spoke was crusted with more of the ubiquitous trees. They dwindled, becoming at some indeterminate distance just a smooth carpet of green fading into the distance.

Beyond that was a gray roof.

"Would you say that's three hundred kilometers up?"

Gaby squinted, then made a grid with her fingers and calculated with some system of her own.

"It covers the right number of degrees."

"Sit. Let's think on this."

She needed to sit more than she needed to think. Until this moment she had actually thought she could make it. She now saw that delusion had been fostered by an inability to visualize the problem. She could look at it now and she quailed inside. Three hundred kilometers, straight up.

Straight.

Up.

She must have been insane.

"First. Does it look like there's any way through that roof?"

Gaby looked, and shrugged.

"Means nothing. There was a way through this, wasn't there? We'd never see it from here."

"Right. But we hoped there would be a ladder to the top. Do you see one?"

"No."

"Right again. I thought those stairs meant a way had been provided to walk to the top, if necessary. Now I think it's likely that a walk to right here, this spot, was all the builders had in mind."

"Maybe." Gaby's eyes had narrowed. "But they must have left a way to get to the hub. Probably these trees weren't meant to be here. They've overgrown everything, like they did on the cable."

"In which case . . ." What?

"We have a hell of a climb ahead," Gaby finished for her. "With all this growth we might never find the entrance. It would probably be easier to locate from the top."

"Right for the third time. I'm just trying to reason it out, you see. It had entered my mind that if—say four or five years from now—if we get to the top and find there isn't a stairway . . . we've got another long climb. Down."

Gaby laughed this time.

"If you're saying let's turn back, I wish you'd come out with it. I won't freeze you with contempt."

"Let's turn back?" She hadn't meant the question mark, but there it was.

"No."

"Ah. I see." She did not mind. They had long forgotten the relationship of Captain and crew. She laughed, and shook her head. "All right. What's your plan?"

"First look around. Later—four or five years from now—we'd look pretty foolish if one of the builders asked why we didn't use the elevator."

TO BE CONTINUED. ■

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THE BELIEVER

Laurence M. Janifer

"Blessed are they who believe without seeing." Or is it "cursed?"

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Taking the long view, Tierens told himself, the girl didn't matter. She might have been anybody—anybody, at the least, just stupid enough to find Tierens in the first place, in his blankly disguised little set of offices.

Stupidity was the requirement, he thought—a shiningly bald bureaucrat facing, across an office desk (not new, purchased at secondhand, quite in key with other visible furnishings), a startlingly intense girl with dark hair, immense granny-glasses, and the figure, pose, and voice of a zealot aflame. The whole period was full of causes—too full; but, then, his opinion hardly mattered. He was, he knew, good at his job. The girl would never see 1978 again—or whatever godforsaken year it was, out there. Tierens kept forgetting.

Still . . . "I can show you proof," he said. "An import-export house, specializing in odd Eastern lots, breakables—"

"I'm sure you have all the proof there could be," she said, and her voice was snap-the-whip sharp. Twenty; twenty-three at the most. "There are people who can prove telepathy doesn't exist, either, you know. But I—well, look now, Mr. Terence—or whatever your real name is: you look. Proof doesn't matter." Her hands stabbed air, her body turned, tightened, jerked as she made her speech. "Proof doesn't matter: I know, I tell you—I know!"

And of course proof never did matter, not to her. If it had—well, if it had, she'd never have come striding into the office, noon sharp, talking up a flame and gesturing as if she were conducting Beethoven's Ninth.

"My name is Archibald Terence," he said in his reedy tenor—quite unworthy of her dramatics, altogether unfortunate. "I am President of Arch Factors, Import-Export, a company which maintains working relationships with a diminishing number, to be sure, of exchanges in the Far East. Our papers—"

"I'll want to know about those companies," the girl said (What was her name?) "But the secret's out, Mr. Terence! You can't—"

"Our papers of transfer are available." (Kathy Bell: a pretty name.) Not that it mattered, of course. Tierens tried to choose just the proper agent for this one, the proper year—there were so many . . .

"Keep your papers," she ordered him—this idiotic Kathy Bell! If necessary, you could remind yourself of the limitations; you could think of yourself as weeding out the species, as the unintelligent left, one at a time, the ones who never needed proof—the ones who, like Kathy Bell, "just knew." Man deserved better.

And Kathy Bell, perhaps, deserved—what she'd come to look for. Weeding out the species: yes, it was a plausible idea. And in any case there were the limitations:

Travel through time exists, and is much needed. Offices must be established at fairly short intervals throughout time, if only to take some care of the lost, the wounded, the fool-

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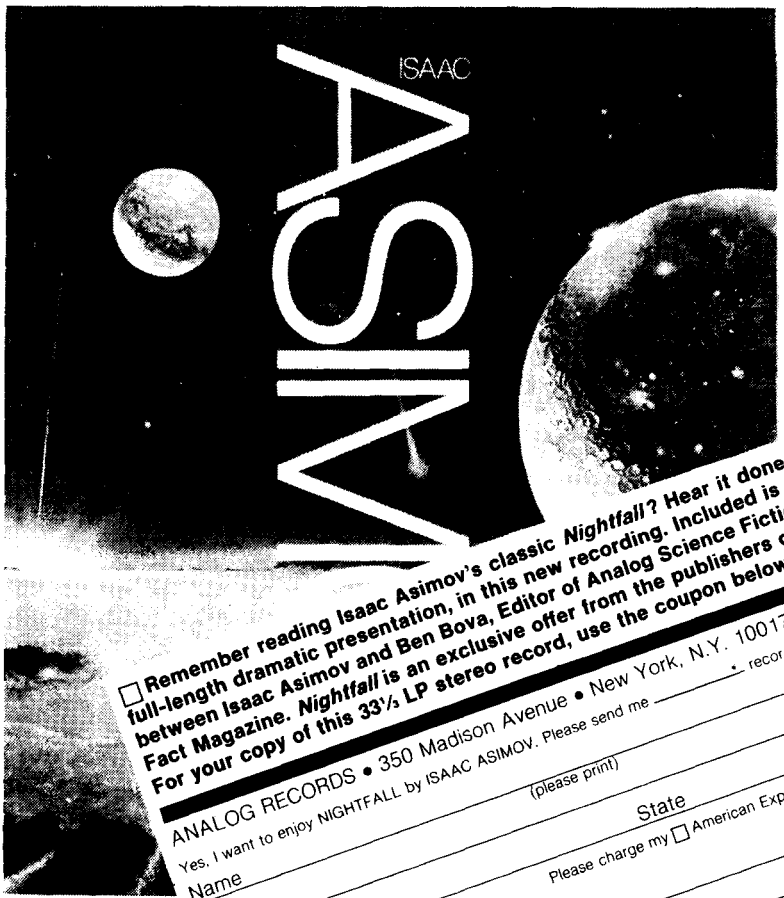
ishly stranded. Before—so to speak—the discovery of time travel and its uses (2500 A. D., a beautifully simple number), the existence of such Offices had to be maintained in secrecy. The chances of panic, of misuse, of one or another sort of temporal blackmail. Well. The girl was going on; Tierens forced himself to listen. "I want to know the truth! I want to know—when did time travel start? What are you doing here? How far do you



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people go, into the past or the future? Can you—can you make *changes*?"

A hushed whisper, that word. Tierens' mind drifted back to the limitations. What Kathy Bell deserved . . .

You had to take the long view, he told himself again. Weeding out the species. And the limitations.

But Kathy Bell, afire and shining with her owned damned light . . .

Limitations. Solid proof could be avoided; whisper, wonder, the faint hint of oddity, could not—not entirely. Enough leakage, from any Office, to draw the ones who "just knew," who didn't need proof . . .

And there they were: what could be done with them? Send them back and create a UFO campaign, never final but loud enough to be fatal to any sort of efficient working. Shoot her on to the Home Office? When the Home Office, 2550 A. D., was grateful even to Tierens and the rest for their small contribution to the population problem; no, one more human being in that world could not be countenanced.

Very well, then: hypnotize the girl. Hand her a forgetter for the episode, and a block against future inquiries; and (because, may God damn Sigmund Freud, Georg Groddeck, Carl Jung, John Rosen!) the work of the mind is an art and not a science, in ten years—1988, if Tierens had the year right—something cracks, and the whole procedure comes spilling back into the conscious mind, with riots and UFO group meetings to come.

No: dispose of her; the limitations had to be that severe. And the disposition, of course, to be through time—into a period, as well, in which her tales would not, could not, provide a riot-spark.

She was staring at him with her great bright eyes. He felt the ritual begin: nothing left but the truth. "You'll have to keep silent about this—" and of course she stood up, battle-ready:

"Really? How do you intend to make me—"

It was certainly recognizable as a gun; whether Kathy Bell, across the desk, knew it was a .45 Magnum scarcely mattered. Symbol was all important.

She stared down at it. "Kill me? With that?" And shook her head. "No: you're from the future. Ethical principles forbid—"

The ritual had taken them up. "How would you know so much about the future?" he said calmly, but of course the bluff didn't work.

Tierens sighed. A few assignment years in Roman's spot might be better . . . and he felt himself nod. Roman, underworked these last months, would be the logical man, the perfect agent. Without a doubt.

Kathy Bell stared down, still holding the edge of the desk. "If you hadn't developed ethical principles like that, the Last War would have happened. We'd be extinct—in which case, no time travel."

Faultless sequitur: both time travel and people like Kathy Bell—believers, of a sort—were bung-full of it. But: "The Last War did happen," he said,

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and she tensed, ready to move. "We were left with a fragmentary culture—and a basic cultural bias against the personal killing of any human being." Not, of course, that Roman's would be any really relaxing post; but it would be a change. And God knows, he told himself, God knows I can use a change.

She was leaning a little toward him. "Then you can't stop me," she said. "Any more than they stopped Rhine—or Blavatsky—or—"

"I can't stop you," he said. "I'll have to give you what you want most." His voice was perfectly flat. "And you don't want answers. You want—time travel itself."

She stared. Tierens went on, quite without hope.

"You didn't need proof," he said. He drew the gun back. "You need indications. A sort of interior knowledge. Like the others—to establish telepathy, or telekinesis—the spirit world and travel out of the body—dream-interpretation of the future . . ." He sighed. "And," he heard himself say in the same tone, "all the others."

The stare went on. No nuance in the girl: there seldom was. "But how could you know *all* the—I've been working with—"

Weeding out the species: yes. Reach forward, and—well, who in 2550, after all, believed that mumbo-jumbo list of tangles?

But Kathy Bell did, in (he was almost sure) 1978. Kathy Bell didn't need proof.

"Of course," she said suddenly. "You checked on me—a time-viewer—whatever you call it—and you could find—"

Tenses as mixed as the jumble of her mind. "I had no need," Tierens said. "The few—the very few—who discover us are all believers." The rest of the human race was either below any fancy of a time-travel station—or above it, and insistent, thank God, on proof. Leakage was unavoidable; solid proof, Tierens' Home Office made sure not to supply.

He was going on:

"What you want most of all is travel to a society—a whole society—that also believes. That believes in such things, not as isolated facts, but as part of a grand, universal scheme of logic. A society in which all such 'wild talents,' so to speak, are taken for granted."

A new voice: breathless, almost worshipful. "You mean—travel to your world? The world of the future."

Tierens, who disliked lying, said nothing and did not nod.

The lie detector really did detect lies. It required fifteen minutes to set in working order, and forty to convince Kathy Bell. (A tougher mind might have required more time; but even that mind would have been convinced.) Putting the call through to Roman took five minutes more: Roman spent every night from nine to ten alone—in that society, not unusual. ("One thing," Tierens said. "There's

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no trouble with time-zones." Part of the ritual, the patter; but her laugh was charming.) He hit the nine-thirty band first try—lie detector connected as he spoke. He'd told her it would even detect Roman's lies, if any, and she'd believed him—handy, since it was true, and he could imagine no way of proving it.

He gave Roman a physical rundown; with no more talk, he said that he was sending Kathy Bell in, to arrive ten days from call date, and that he needed Roman to give her the usual build up.

"Mind reader? Telekinesis? Dream interpretations? The—"

"Everything," he said. Kathy said: "But—" and Tierens waved her away. "A good job. Might as well give her the biggest, fastest reputation we can manage."

"In ten days?" Roman said. "Well . . . out of town. I've heard of, never met. And all the rest of that. Right."

"Right." The technical data: exact coordinates, power drain and levelling, masking needs; none of that interested Kathy. She scarcely listened until he rang off and detached the lie detector.

She began again: "But—"

"You do want the reputation, don't you?" he said. Of course: they always did. Positive, or latent—never absent.

"But I can't—well, I'd like to, but I haven't got real control, and I'm just not sure—"

"Reputation is all you'll need, for a while," he said. "It will be completely accepted. Meanwhile—" He took a long breath, and told his only lie. "Meanwhile, Roman will give you speed-training—as much as you both can fit in."

She was in mild shock—which he maintained with chatter about training, about Roman ("A jolly, overweight type. Not at all like me. Most people take to him at once."), about anything he could think of.

He was ready to send her off before she reached her normal state of imbalance again.

And then, of course, he told her. It would have been a heartbreaking pity to have sent her out into the time and place he'd described—without specifying just where, and just when.

He could see her, inside the machine's framework, as she began to realize that he was quite, quite sincere. Her face whitened in a new, more deeply founded, shock—and she began to blur, and then, slowly, in patches like grey smoke, shiver and disappear.

He hoped she'd have the sense—some did—to confess quickly, once Roman had told the town she was a witch. That way, the worst she could look forward to might just be death—and a fairly fast death, at that.

Compared to some.

Tierens heard the overtransfer *click* and shut the damned thing off. After that—it wasn't even midafternoon, not quite—he went back to his desk and began checking manifest lists, until closing time.

Nobody else came in, thank God. Nobody else, not all that day. ■

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THE ELEMENT

STEPHEN L. SUFFET

BRAD HAMANN

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I

It never was supposed to happen.

Nuclear scientists weren't supposed to suddenly die without a prior hint of disease or disability.

Nor were elements that heavy supposed to exist. Their nuclei were thought to be too unstable, too quick to decay into simpler substances, too high in atomic number and mass to fit any of the designated slots on the periodic chart. Yet the element did exist, not for a moment of instantaneous disintegration, but for a time sufficiently long for the Delta Project researchers at the University of California's Lawrence Radiation Laboratory to accurately establish its atomic number as 152 and its mass as 441.

So too did the element's discoverer, Dr. Leonard Michael Halberstam, inexplicably perish a mere four days after the discovery.

It was in the first few minutes after the confirmation of the new element's existence that Professor Halberstam, the director of the Delta Project, began considering its name. Already he had rejected as too clubby and self-congratulatory the notion of naming his find after a scientist. Instead he toyed with the idea of honoring a great historical figure—lockium, socratesium, and lincolnium were appelations he considered before deciding upon jeffersonium.

Halberstam was about to call the university's public relations office to arrange a press conference when he changed his mind. Certainly Thomas Jefferson deserved an element, but what kind of precedent would it set? What if the Russians came up with a new element and called it marxium or leninium? Or what if the Chinese found one and named it after some party leader who five years later fell out of favor? Would they then try to change it? No, the good professor decided, no political names no matter how innocuous—in fact, no human names of any sort!

It was then that Dr. Halberstam turned to the heavens, not to pray for guidance but to take a name from the solar system. There was helium, christened for *Helios,* the sun, where it was detected with the spectroscope many years before being found on Earth. The elements cerium and palladium had been named after two asteroids, Ceres and Pallas, first seen in the early 1880s, while the word selenium was derived from *Selene,* the Grecian moon-goddess. Then there were uranium, neptunium, and plutonium, the three sisters of atomic fission named for the three most distant planets—and of course quicksilver, the bright metallic liquid element called mercury by the ancient alchemists in honor of the fleetest of planets. Leonard Halberstam would call his discovery "jupiterium," for only the most massive and mysterious planet could justly befit the designation of this most massive and mysterious element. Jupiterium, chemical symbol J. The press conference was scheduled for June 21, the first day of summer.

Some time around 9 PM June 20, Dr. Halberstam was found dead in his

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laboratory. A few micrograms of jupiterium chloride were found nearby.

In the matter of Leonard Michael Halberstam, *so read the title of the Alameda County Medical Examiner's inquest report. Accidental poisoning was initially suspected. So toxic were all of the previously known transuranium elements that it was simply assumed that the unfortunate man had perished by inadvertently inhaling or absorbing an immeasurably subminute portion of his specimen. The pathologist in charge of establishing the cause of death, however, had no previous experience with cases of this kind, and following good open-minded procedure suggested that a sample of the jupiterium salt be fed to a laboratory animal. This was done, and while the subject, a standard lab-bred albino variety of* rattus norvegicus, *showed immediate signs of gastrointestinal distress, it did not drop dead. Quite the contrary, it pulled through its crisis, and by the following day it was completely well. The full quantity of jupiterium was recovered from the rat's daily output of excrement, the new element having passed unabsorbed through the host's system.*

The pathologist repeated the experiment using an adult male chimpanzee and the result was the same—an acute upset stomach followed by a bowel movement and a return to good health. All he could list on the death certificate was "cardiac arrest" as the cause of Halberstam's demise, somewhat perplexing for a usually healthy forty-seven year old.

II

Leonard Halberstam had come of age in the Bronx, where he and his parents had found safe refuge from Adolf Hitler. His childhood home was a three-and-a-half-room fourth-floor apartment in a huge reddish-brown brick edifice with an enormously spacious lobby and a bronze-and-glass art-deco front entrance leading out to the Grand Concourse.

It was there that he had first discovered elements—the playfully swift globule of mercury he kept in an airtight jar as a souvenir of the day a thermometer broke, the schmutzy black carbon that covered his fingers when he'd snitch lumps of coal from the cellar, the almost magical helium which lifted many a careless tethered balloon to the upper reaches of the atmosphere. Leonard learned his lab technique by watching his father compound prescription remedies in the pharmacy he owned beneath the elevated tracks at the corner of Mount Eden and Jerome Avenues. The heavy thick glass graduate, the ancient copper mortar and pestle, the pipettes and medicine droppers, the endless rows of empty two-ounce cobalt-blue bottles became young Halberstam's playthings. As Leonard got older, his daring experiments frequently filled his father's drugstore with the aroma of many glorious concoctions.

It was also in the Bronx that Leonard Halberstam learned of another

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element—one not to be found in any laboratory or textbook—not even *an* element but rather *the* element. The element. Dark, foreboding, dangerous. Ever growing, ever spreading, ever becoming more massive and threatening.

At first the elder Halberstams referred to them as *der schvatzes*—the blacks—but the term proved somewhat inaccurate, for the element included many Puerto Ricans, some of whom were very Caucasian, while it excluded certain Negroes such as Joe Louis, Louis Armstrong, and Eddie Anderson. After all, it was pretty hard to think of Jack Benny's Rochester as the element.

When four-year-old Leonard originally landed in New York on New Years Day 1934, the element was safely confined to a small area in the southernmost portion of the Bronx, a few regions of Brooklyn, and a large forbidding stretch of central Manhattan known throughout the world as Harlem. Aside from the janitor's assistant who raked the ashes out of the furnace, the element was completely absent from the old yellow school where Leonard went from kindergarten through eighth grade. But as Halberstam grew older, the element began to spread out, very slowly in the beginning but gaining a perceptible momentum. It was present in small numbers when Leonard attended William Howard Taft High School, and it was even there when he studied at City College. By the time he received his BS, the first of the element had made its way as far north as Yankee Stadium, with more pouring in every day to occupy every nook and cranny of the Bronx south of that point.

Meanwhile, the color barrier had been broken in baseball, and Leonard Halberstam was proud of the fact. Jackie Robinson, dark as he was, certainly wasn't the element, and it only made sense that he be accorded the same opportunity as any player. That was only fair, the American way. So Leonard, while remaining a devoted Yankee fan, routed Robinson on—just as Leonard's parents were pleased to hear of Jesse Owens's gold medal victory in the Munich Olympics, and just as the whole Halberstam family was ecstatic when the Brown Bomber Joe Louis punched out the Führer's *übermensch* Max Schmelling in the first round of their return bout. Yes, sports were one thing; neighborhoods were something else. In the ballpark you found Negroes, black Americans, colored gentlemen, people of African descent, each deserving a fair shake—on the streets of the Bronx you found the element.

Ironically, to some people Halberstam himself was the element. His parents knew this all along, but their son Leonard wasn't old enough to remember firsthand the smashed windows of his father's shop in Berlin, or their comfortable home in the suburb of Brandenburg smeared with the red warning paint of "Achtung! Juden!" Undeniably there were some inhospitable Irish kids along the Grand Concourse—ones who yelled "Christ-kill-

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er" or "bastard Jew" at him—but it wasn't until the army that he had encountered any really virulent anti-Semites.

The first one was a beefy Alabama-bred NCO named Henderson Taylor who greeted Leonard as he emerged from the bus at Fort Dix, New Jersey. To Sergeant Taylor, this new recruit from New York was neither a Christ-killer nor a bastard, but simply a "Jew boy," and it was that particular epithet that infuriated Private Halberstam most of all. It was probably this affront to his manhood that motivated Leonard to apply to O.C.S., and in a matter of eight months Halberstam outranked his tormentor despite Taylor's eleven years seniority in the service. The only drawback was that the old sergeant would remain safely in the Garden State while the newly commissioned second lieutenant would pass some time on the shores of the Chosin Reservoir.

Who said a Jew boy couldn't fight? In one year of actual combat, Leonard Michael Halberstam advanced to the rank of captain while earning five major citations, including a curiously Christian symbol from a supposedly secular government, the Distinguished Service Cross.

Leonard left the service in '54, packed his engineering degree into his suitcase, and flew to Richmond, California, where he went to work for Standard Oil. There were no outright Henderson Taylors in the petroleum business, but it didn't take him too long to understand that he'd be happier elsewhere. Within two years he quit Calso to get his MS from the University of California. By the fall of 1959, he had a PhD and a secure appointment to the chem department at Berkeley.

On the UC campus there was still another element. This one existed in various sizes, shapes, and colors, but as Halberstam saw it, always tinged with a shade of red. Only a few years earlier, the professor had been honored for killing reds, and had even believed that his contributions along with the sacrifices of others had stopped the reds at the thirty-eighth parallel. Subsequently he was proven wrong as they routed the French at Dienbienphu, rolled their tanks over unarmed Hungarians, and swallowed up the island of Cuba. Now they were in California, and Dr. Halberstam didn't like it. But he was tired of fighting no-win battles, and moreover he was terribly confused, for the element he observed on campus didn't resemble anything he faced in Korea. In Berkeley the element wore Levis, open-collared shirts, and went months without taking a haircut—quite different from the rigid, crew-cut, uniformed Asian variety.

In his weariness and bewilderment, Halberstam retreated from the conflict. He had by 1964, when the turmoil of the Free Speech Movement erupted into open rebellion and mass arrests, been relieved of his teaching duties at his own request so he could devote full-time to research work at the Lawrence Radiation Laboratory.

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At least the elements there could be contained in a test tube.

III

"We are," Professor Halberstam explained to a large group of faculty from other divisions of the university, "continuing the basic research begun by Becquerel, Rutherford, the Curies, and other nuclear pioneers around the turn of the century. When radioactive elements were first discovered in the late 1890s, it was found that they emitted three kinds of radiation which the New Zealand born physicist Ernst Rutherford called by the Greek letters alpha, beta, and gamma."

Halberstam hated these faculty seminars, but was required to participate in them. Often the other professors knew much less about the scientific world than did the freshman class in the chemistry or physics department, and his lectures were therefore tantamount to those he'd give in an introductory undergraduate course.

That particular day Halberstam enjoyed his task even less than usual. It was one of those Vietnam Moratorium protest days, and his audience was a sea of black armbands. On top of this, the newly created Black Studies Department was out in force; Leonard interpreted this as meaning they wanted to learn the secret of the atomic bomb. A young research assistant named Darryl Richardson suggested that perhaps they were present to satisfy their intellectual cravings, or maybe to establish a good rapport with the rest of the Berkeley faculty. But since this young man sported both a black armband and a black complexion, Halberstam figured his ideas to be just apologies for two elements; Richardson's bushy whiskers and somewhat unkempt Afro confirmed this hypothesis.

The professor continued his presentation. "In the intervening years," he told the gathering, "other emissions of radioactive decay were discovered. Among these were the neutron, first postulated by Sir James Chadwick in 1932, and the positron, a particle of so-called antimatter because it is identical to beta radiation except that it carries a positive electrical charge instead of a negative one.

"Many other forms of nuclear radiation have been found, including both subatomic particles of matter and true rays of electromagnetic energy. Virtually all of these had been predicted mathematically before being observed empirically. In other words, we scientists had roadmaps, actually mathematical formulas, to help us find what we were looking for."

The audience followed the lecture with little difficulty. Richardson, seated on the dais behind his boss at the lectern, scanned the auditorium and smiled "hello" to some of his soul-brothers, as well as to a "sister" who happened to be white.

Fully indifferent to his listeners unusual attentiveness, Leonard went on. "But recently," he said with unbroken monotony, "we here at Berkeley have been faced with an intriguing and yet bewildering puzzle. We have substan-

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tial evidence of a thoroughly new type of radiation, a type of radiation *which not only was not predicted in advance, but which also fails to conform to any mathematical model we have been able to construct afterwards."*

Halberstam paused as those seated in front of him started to murmur. It was the first time ever that he realized his audience was capable of comprehending his subject matter. This delighted him so much that he began to stand a little less rigidly, nodded a couple of times in appreciation, and even thought to himself that Richardson's suggestion was correct.

Considerably more content than he had been earlier, the scientist concluded his talk. "We have tentatively called this new phenomenon 'delta radiation,' and I have been appointed to head a team to study it."

There followed a surprisingly loud applause; academicians usually aren't ones to clap much for someone else's research. Dr. Halberstam sat down quickly as Richardson, the assistant, stood to field questions. A hand shot up immediately.

"Yes, Jack." Darryl Richardson liked to call people by their first names, and if he didn't know their first names all men became Jack.

"Are there any special problems encountered in studying delta radiation?"

"One big one, Jack," Richardson replied, "and that's the fact we haven't been able to produce a source of delta radiation that lasts more than a ten-billionth of a second. That's what our colleagues over at the human sexuality lab would call one hell of a quickie."

Everyone laughed except Leonard Halberstam who never did appreciate Darryl's spicy style. As the chuckling subsided a second hand was raised.

"Go ahead, Marina." Richardson called upon the woman to whom he had smiled, Marina Davies, psychology instructor and faculty leader of the anti-Vietnam War protests.

"I assume," Miss Davies declared, "that the military is behind the Delta Project. Is that not so?"

"I'd better let Professor Halberstam answer that one himself," Richardson responded, simultaneously moving aside to allow his boss to return to the podium.

An annoyed Halberstam quickly got up. "Absolutely untrue!" he told her indignantly. "What we do here is basic pure research without any connection to the military whatsoever."

"Bullshit!" shouted an anonymous voice from the audience.

"Bullshit!" repeated Marina.

"Bullshit," whispered Darryl under his breath.

The element was closing in.

IV

Eight years had passed since that afternoon in October '69 when Leonard Michael Halberstam was barraged with barnyard obscenities. Darryl Richardson, having obtained his doctorate, was appointed assistant professor and thereafter replaced his boss in the annual task of explaining the Delta Project to the universitywide faculty

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seminar. Marina Davies, meanwhile, had also earned a PhD and had become director of the campus psychological counseling service, in which capacity she saw Halberstam several times when his work had become too frustrating or the outside world too depressing. She had given up the peace movement when the war ended, and had moved on to American Indians or boycotting lettuce or some other cause; yet she still harbored the suspicion that the Delta Project was somehow nefariously connected to the Defense Department.

Dr. Davies was wrong; although military and CIA analysts routinely monitored the progress of Halberstam's research, the Pentagon in no way sponsored, funded, or controlled it. She wasn't mistaken, however, about another of her suspicions.

"Len," she once asked when Halberstam had come to her office, "do you have any life outside of the laboratory?"

"Not anymore," he acknowledged.

She learned that at one time he did, or at least he supposed he did. Friendships, romances, loyalties—they had all proven too unstable, too uncertain. Circumstances, conditions, conventions, and even desires all changed so rapidly and unpredictably that Leonard restricted himself to a realm where everything could be weighed, measured, and classified with absolute scientific precision.

When the psychologist Marina Davies questioned him about sex, Dr. Halberstam responded with generalizations which evaded any specific reference to himself, but which nevertheless revealed the direction of his conflicts and anxieties.

"Once upon a time," he told her, "the only acceptable relationship was between one male and one female joined together in holy and legal matrimony. Then," he went on, "it became okay to forgo the wedding ceremony as long as it was still one man and one woman. But nowadays," the scientist concluded, "you've got every possible combination and permutation of numbers and sexes sleeping together—I don't know what's happening anymore. Next thing you know, there'll be a queer in the White House, if there hasn't been one there already."

From Leonard Halberstam's perspective, human sexuality had become dominated by a new and ever-encroaching set of elements—free-lovers, feminists, homosexuals—whose presence could be detected everywhere from coed dormitories to gay rights marches. Unable to deal with these elements, or even with the intimacies and demands of a conventional marriage, Halberstam limited his sex life to an occasional one-shot pickup from a San Francisco bar, or to an even less frequent romp with a call girl at an out-of-town professional conference. Other times he sublimated his erotic drives by putting in late-night overtime on his research.

It wasn't in politics or sex, but in the area of race that Dr. Halberstam felt most threatened by the element.

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Back in the Bronx, a rash of burglaries and holdups, all perpetrated by young blacks, had forced his pharmacist father into an early retirement to Florida—where the elder Mr. Halberstam was then robbed at knife-point by a gang of Cuban exiles looking for money to buy cocaine. The old apartment house on the Grand Concourse was a shambles, packed with welfare cases and alcoholics, and stinking from urine in the hallways. The last remaining Jewish families had been chased out by vandals and purse-snatchers. Meanwhile, closer to home, San Francisco had recently been terrorized by the Zebra-killers, a secretly organized black cult that randomly stalked and murdered white victims. Until the killers were caught, Leonard stayed clear of the city.

Yet Professor Halberstam wasn't a simple racist or segregationist. "I refuse to believe," he once told Dr. Davies during a counseling session, "that *all* Negroes are bad. It's just that a lot of them are."

Nevertheless, it was the good ones that often bothered him as much as the criminals and sociopaths, for it was they that demanded open admissions, affirmative action, and preferential treatment. "I don't deny," Halberstam sometimes mentioned to white colleagues, "that these schemes are remedies for past discrimination. But I think we've come to the point where the cure is worse than the disease. If all this crap goes on much longer, this university's gonna look like the Grand Concourse."

"The what?" he would invariably be asked.

"The street I used to live on in the Bronx. It was once a nice place, but now it's shot to hell."

His listeners always understood.

V

Darryl Richardson stopped by the lab just before 5 PM. Since discovering jupiterium a few days earlier, Dr. Halberstam was the proverbial big-man-on-campus—at least among the nuclear chemists and physicists of the Lawrence Radiation Laboratory. The phone rang incessantly, so he took it off the hook, forcing Richardson to pay a personal visit. As Darryl walked in, Halberstam was preparing his notes for the next morning's press conference.

"Lenny, I have some good news," Richardson said as soon as he entered, "Marina and I are getting married."

"Marina Davies, the psychologist?"

"That's right, Lenny. What other Marina do you know?"

Halberstam hesitated for a few moments. He liked Darryl and he liked Marina, and he knew—intellectually at least—they were well suited for each other. But the thought of an interracial marriage, especially between a black male and a white female, offended his sense of order in the universe. He managed, however, to carefully suppress any outward expression of disapproval, and in a couple of seconds heartily congratulated his fellow scientist. Then he sent him

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on his way.

As Dr. Richardson was the last one to see him alive, the rest of Dr. Halberstam's story can only be reconstructed from the cassette recordings he dictated for the laboratory log as he worked.

At ten minutes after five, according to the first of these recordings, Halberstam began to examine a jupiterium chloride specimen. Jupiterium, he had found but was yet to publicly announce, is a weak but long-lasting emitter of delta radiation. His creation of the new element was therefore an extremely critical breakthrough for the Delta Project, for at last there was a delta radiation source that did not disappear at once. Perhaps he had hoped in the next few hours to learn enough about delta radiation to tell the press some preliminary findings. Perhaps not.

The first thing the professor did was weigh his specimen, which according to previous entries had been 4.72 micrograms. *This time he found it to be 4.76 micrograms.*

The discrepancy was unimaginably tiny, a mere four one-hundred-millionths of a gram. Still, a radioactive element was supposed to decay, get smaller, weigh less as time went on. Certainly it wasn't supposed to increase by even the slightest amount.

"The possibility of some error exists," Dr. Halberstam dictated into the cassette machine at 5:35. "Perhaps a contamination of the specimen or a misreading of the original measurement. Maybe even a mistaken entry into the lab records. I'm going to repeat the weighing procedure using sample number two of the jupiterium chloride."

Again the result was similar. The second specimen had also gained weight. The same was true for the third specimen, and then for the fourth.

Halberstam's last recording began at 8:05. His voice sounded terribly excited, almost agitated, more like he was debating politics than dictating scientific data.

"Incredible as it may seem, I have come to the conclusion that the element exhibits a property I can only call 'reciprocal half-life.' Put very simply,"—his speech became higher, quicker, and more disturbed—"instead of decaying like it should, this element is growing in size. According to my best calculations, it will double its mass every thirty-five to thirty-six days. What we have here," a desperate voice concluded, "is the story of the sultan and the chessboard."

At 8:45, Dr. Leonard Halberstam failed to respond to a routine security-safety check. A part-time building guard, a retired army sergeant named Henderson Taylor, was dispatched to investigate the problem. He found his old platoon recruit dead.

VI

"The solution to the puzzle is actually quite simple," Darryl Richardson told his audience of six, "once you understand this mathematical statement . . ."

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He arose from his chair to write the following symbols on the moveable chalkboard nearby:

$$V_{\Delta} > C$$

". . . the velocity of delta radiation," he continued, "is greater than c, the speed of light. In other words, delta rays are really tachyons, superfast particles that defy all known laws of physics."

"Tachyons?" someone interrupted. "According to present theory tachyons would never interact with slower-than-light particles. We'd have no way to detect their presence."

"So much for present theory, Jack!" Richardson retorted. "What we have here is a new phenomenon; later we can write the new theory. Besides, I'm not claiming that I've actually *seen* any tachyons. I'm only saying that my explanation best fits the conditions I have observed."

"And would you say," someone else suggested, "that this tachyon theory of yours explains why delta radiation has been such a mystery?"

"You're right. That's precisely what I'd say."

After six months of nonstop investigation, Dr. Richardson was delivering his final report to a small, high-level, closed-door committee of senior researchers who were conducting a postmortem of Halberstam's work. It was a difficult job for the young scientist, but he was the one man most familiar with the late professor's research. He had an even more difficult job getting permission for his new wife to sit in on the presentation to the panel.

"Speaking of mysteries," another listener asked, "what about Dr. Halberstam's element jupiterium?"

"Just an illusion," Richardson replied.

"An illusion?" the questioner demanded.

"That's right. There never was an element jupiterium. There just appeared to be."

"And how do you explain that? Professor Halberstam was an exceptionally careful researcher, and his observations were confirmed by many other internationally recognized scientists, including several in this room." The speaker was none other than Dr. Winslow Fitch, the deputy chancellor for all scientific research at the University of California.

"The answer, as I said before," Richardson reminded everybody, "is rather simple, once you keep in mind that delta particles travel faster than light. If you remember your basic relativity you should recall that as an object approaches the speed of light it begins to behave in ways that no longer can be explained by the normal laws of time, space, and matter. A clock, for example, moving close to the velocity *c* runs slower than one standing still. A rocket ship traveling almost at the speed of light is shorter in overall length than that same ship traveling slower. Similarly the constant stream of delta particle tachyons emitted by his so-called element made it appear several times more massive than it really is."

"Then if jupiterium isn't a new

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element," Dr. Fitch wanted to know, "what is it?"

"Just an isotope of silver. Atomic number 47, atomic mass 108."

"Silver?"

"Nothing more, nothing less—except this particular type of silver gives off radiation that travels faster than light."

"Do you think that's why," another panelist queried, "nothing happened to the coroner's lab animals?"

"Absolutely correct," Darryl responded. "A couple of micrograms of insoluble silver chloride passed right through their systems without any effect other than the temporary bellyache induced by delta particle bombardment of the digestive track."

"And what about the reciprocal half-life?" still another scientist wanted to know.

"Another illusion. The jupiterium wasn't gaining weight at all. It just appeared to be growing bigger because of a momentary flare-up in delta radiation intensity. Had the professor examined his samples a few weeks later he wouldn't have found any increase."

"Then jupiterium doesn't double in size every thirty-five days?"

"Correct again, Jack. Silver doesn't get any bigger, and neither does jupiterium."

"What about the thing about the sultan and the chessboard?" someone inquired.

"It's an ancient Hindu story," Richardson explained. "It seems there was this old sultan who was very miserly and also pretty dumb. One day he owed a servant a loaf of bread, and this servant, being a really slick operator suckered his master into a deal. He said, okay boss, forget about the loaf of bread and give me some grains of wheat instead. Thereupon he produced a chessboard and asked the sultan to place one kernel of wheat on the first square, two kernels on the second square, four kernels on the third square, eight on the fourth square, and so on, doubling the amount of wheat with each subsequent square. The sultan agreed, but it wasn't long before he realized his mistake. To fill all sixty-four squares he would have had to give his servant the entire world's wheat production for the next ten thousand years. I sincerely believe that it was this realization that killed him."

"Killed the sultan?" Dr. Fitch asked.

"No, killed Leonard Halberstam," Richardson shot back. "You see, he must have believed that it was only a matter of time before the element engulfed the whole world and then went on to destroy the universe. That thought could have easily brought on his heart attack."

"Dr. Richardson," the deputy chancellor wished to know, "are you privy to the thoughts that went on inside the late professor's mind?"

"Not exactly, sir, but I can call upon someone who is. Gentlemen, may I present my wife, Dr. Marina Davies Richardson, professor of clinical psychology and director of Berke-

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ley's campus counseling center."

Marina took a few minutes to further introduce herself, to thank those present for allowing her to speak, and to remind her listeners that what she was about to say must be held in the strictest confidence. Then she began.

"Leonard Halberstam," she said, "was a brilliant man deeply troubled by his own fear and anxiety. He retreated into a realm in which he thought everything could be controlled and predicted, a realm governed by the absolute rule of law, even if the laws of Einstein had replaced the laws of Newton. Within this self-imposed isolation he felt for a time he could be safe from the threats and dangers of a world which like the delta particle was moving just too fast for him to comprehend. But, alas, he was wrong, for what he found inside the laboratory was the same thing he found outside of it—the element."

"Jupiterium?" Winslow Fitch questioned.

"Jupiterium is what he called it, at least in the lab, but it went by other names as well. So let's just say 'the element.' "

"But your husband just told us the element is an illusion."

"True enough," the female Dr. Richardson responded. "But illusions can be deadly. In this case the illusion was one that kept on growing, crowding him out, sapping the world of its material and energy, and destroying everything in its way. Wherever Leonard Halberstam would turn, there would be the element, becoming ever more malignant, until it wiped out not only him but all of civilization as well. In the end," she concluded, "he was a victim of his own misinterpretation of reality. The element that destroyed him was merely the element within him."

VII

There is no jupiterium. But five years later Dr. Darryl Richardson did discover a new element, number 109 on the periodic table with an atomic mass of a very reasonable 262 and a normal half-life of twenty-seven minutes.

He named it halberstamium. ■

MAN masters nature not by force but by understanding.
This is why science has succeeded where magic failed: because it has looked for no spell to cast on nature.
DR. JACOB BRONOWSKI

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Edward Wood

I'm sure I was not alone in being displeased when Ben Bova's *Millennium* failed to make it to the Hugo nominations for best novel of 1976. However, in COLONY (Pocket Books $1.95) Bova has written an even better novel which means it's his best to date. It has a small connection with *Millennium* in that we meet again, very briefly, Frank Colt, Emanuel De Paolo and Leonov. This is not their book. This is the book of David Adams, a genetically enhanced man born on Island One. Island One is a space colony akin to O'Neill Life Colonies but in the L4 position for reasons of economy (not specified) and aesthetics (specified).

The action of the novel covers the time period May 2008 to December of the same year and ranges from Island One to the Moon to various portions of Earth. A world government is trying to feed and obtain energy for eight billion people while the Five Corporations own everything of value on Earth and in space and are content to keep it that way. They secretly supply arms and money to the People's Revolutionary Underground. (PRU), a very large international, terrorist organization, that believes national governments can handle the world's problems more efficiently and with greater urgency than the world government. To keep the pot boiling, the Five Corporations start a few famines here and there with their control of the weather. Much of the action is on Earth. David Adams travels to Earth to actually see

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conditions for himself. Everyone wants to find him because of his expert knowledge of Island One's operations and construction. It is a fast moving story that gives a very convincing picture of the future. Bova has written a story that makes the reader want to read more and more after finishing the last page—that's a true victory of the writer's craft.

But it is not a perfect book. Bova believes corporations are much more efficient than I do. Also I don't understand how David Adams is genetically manipulated after being saved from his mother's womb (she was a worker killed during the construction of Island One) as a fetus of two months. That's a lot of cells to change, even in groups. Also terrorist movements that are small can remain fairly secret but large movements invite infiltration and counter action.

It is not the prerogative of a reviewer to tell a writer what to do but *Colony* and *Millennium* could be the beginnings of a joyous romp across the 21st century with a book per decade per planet/satellite, so by 2100 A. D. mankind would be fairly close to Pluto.

Pocket is trying to market the book as a straight novel to judge by the studied avoidance of the words 'science fiction' on the cover or in the blurbs. Yet in the ten or twelve stores where I've seen the book on sale, it was always displayed with the science fiction books and never with general fiction. Book store personnel seem to know that the book is science fiction and that Ben Bova either writes science fiction or a good brand of popularized science. They have circumvented Pocket's marketing strategy. Probably because SF sells so well.

Books about science fiction are in an explosive growth phase at present and encyclopedias, handbooks, biographies, bibliographies, criticisms and memoirs are flooding the market. For the research minded in the audience there is the recent **A RESEARCH GUIDE TO SCIENCE FICTION STUDIES** (compiled and edited by Marshall B. Tymn, Roger C. Schlobin and L. W. Currey, Garland Publishing, Inc. 1977 $21.00). The book also includes a thirty-four page title listing of doctoral dissertations compiled by Douglas R. Justus. It is the most complete contemporary listing of works about science fiction. But like all such efforts it is out of date before it's off the press. Therefore one has to judge books of this nature by criteria of completeness and accuracy. Errors always seem to creep into factual books but their number should be few; otherwise the authors will be called hasty or careless (perhaps both). I think the books will be valuable.

The trio of compilers and editors bring in the typical library aids that would be used for any subject; *Book Review Index, Library of Congress Catalog, Books in Print,* yet they omit the essential *Contemporary Authors.* They list Majorie Hope Nicholson's *Voyages to the Moon* but skip her equally valuable *Science and Imagination* paperbacked in 1956 by Great Seal Books. D. C. Richardson's book about Max Brand is not listed nor Bob Bloch's *The Eighth Stage of Fandom.* Also for some reason, the bulk of art books about science fiction are squeezed into a single item (#152) while James Gunn's *Alternate Worlds*

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has a listing all to itself. Consistency in the various entries is most desirable.

Most of the entries are well done but a few are highly misleading: consider the one for Damon Knight's *In Search of Wonder* which has been in print for twenty years or more, "A collection of critical book reviews written by Knight for the *Magazine of Fantasy & Science Fiction* from 1952 to 1955." Since the publishers have *two* pages of acknowledgments indicating in careful detail where the various sections of the book first appeared, Tymn et al are certainly incomplete in this case.

What do the eagle-eyed trio say about the late Don Day's *Index to the Science-Fiction Magazines 1926-1950?* ". . . and with the exception of three British titles (*Fantasy, New Worlds,* and *Tales of Wonder*), all are U.S. publications." This is somewhat of a fooler since the title *Fantasy* in Day's *Index* hides two British publications with different publishers, editors and formats, both lasting three issues, one published before World War II and the other after World War II. Many U. S. publications are excluded for one reason or another from Day's *Index*. The same reasons probably apply to Day's coverage of foreign English language magazines.

The availability of items listed in the book is not indicated and the interested scholar might find it hard to get hold of a copy of say *The Fanzine Index* (item 67) of which probably there are less than 400 copies in the world.

In spite of the several deficiencies noted, the bulk of the information is accurate and I recommend it for the science fiction scholar.

Ace calls Steve Wilson's **THE LOST TRAVELER** (Ace Books, $1.95) "A Science Fiction Western and Motorcycle Quest Epic" which is a bit better than the St. Martin's Press hardcover phrase which reversed the above and inserted the word "Grail" between motorcycle and quest. For a moment, I thought combining SF, westerns, motorcycles, and religion was really something else.

The story begins slowly, with the destruction of civilization in 1992 or 3 by nuclear, drug and chemical attacks. Parts of the U. S. of A. survive. One of the surviving groups is the Hell's Angels Motorcycle Club who survive seemingly because of their previous exposure to all kinds of drugs and their intense group loyalty and identity. In the poetic language of the author, "Over two hundred summers had passed." There is now an Eastern Seaboard Federation (ESF) which is on its way to Manifest Destiny. The South with its oil cartel around the Gulf of Mexico exists to supply oil to all buyers. The Great Plains are inhabited by Indians who are fighting the ESF. On the West Coast are two fiefs, one called The Fief and the other, The Peregrine Fief. There are also the Dead Lands where people cannot live. However a Professor Sangria (from the South) but working for the ESF because they have the resources and equipment has a method of detoxifying the Dead Lands. Long Range and two other Hells Angels (with motorcycles) are sent to bring Professor Sangria from East to West. The adventures during this quest and the final shootout between an expedition-

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ary force from ESF and two Fiefs take up the bulk of the book. Long Range is looking for a way of life that has meaning for him. This is an aspect that author Wilson might have dwelt on a bit more. While the author ignores many questions, the readers might not be as kind. Why, in a culture that has powerful motorcycle engines, are there no flying machines? Also how have roads been maintained through the Dead Lands? And what has been going on in the rest of the world?

I cannot recommend the book as an essential one for the veteran science fiction reader, but it is something to look at if your reading matter is in low supply.

Colin Kapp's **THE ION WAR** (Ace Books, $1.95) has a hero named Dam Stormdragon involved in an Earth vs colonies war. The reason for the war is never made very clear but it is said that "dissension" with the mother-world is responsible. All loyal colonies have to supply personnel for a year's service in the armed forces of Imperial Earth which just happens to have an invincible weapon, operated mainly by colonial personnel who . . . yep, they turn the superweapon against Earth. In spite of some words about journeys of thousands of light-years through tachyon space, it's not a very logical book and depends upon your enemy being blind as a bat and stupid to boot! Not recommended in spite of the Darth Vader look alike on the cover.

Ian Watson's **THE MARTIAN INCA** (Ace Books, $1.95) presents some ingenious ideas about Martian lifeforms.

An unmanned Soviet lander back from Mars crashes in the Peruvian Andes. The village of Apusquiy is the lucky recepient of all this space hardware. Soon peope begin to die of something akin to meningitis, all but one Julio Capac, who escapes treatment by the medical authorities and now tells everyone who will listen that he is the Son of the Sun, the Inti, The Inca. A revolt against the established government starts in Peru. Meanwhile, a manned American expedition to Mars has been getting closer to the red planet. The information about the Soviet lander gets to our friends in the U.S. and to the manned lander. They make it to the surface of Mars intact and the Martian lifeforms begin their work. As far as I can figure out, all loose ends are satisfactorily tied up by the end of the book. The explanation of what happens to the memories and minds of humanity because of the Martian lifeform takes some close following but it has a weird logic to it. The book can be read on several levels, for the events described, or with the Martian life gimmick integrated into the story. See how you figure it out. Recommended.

Fred Saberhagen, justly framed for his *Berserker* series, has in **THE VEILS OF AZLAROC** (Ace Books, 1978 $1.75) come up with an unusual world indeed. Azlaroc "whirled through space in an intricate orbital dance with a fluid-core pulsar and a black hole of moderate size." At yearly intervals (Earth years at that!) veils of energy fall to the surface of Azlaroc changing the time coordinates of those on the surface of Azlaroc so that they cannot ever leave Azlaroc and they become increasingly separated from those

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trapped by other "veilfalls." If you count the first "veilfall" that trapped people on Azlaroc as one, the book deals with "veilfall" #430. Time passes slowly in any particular "veilfall" so that one has a "strange" limited immortality. Unfortunately for Saberhagen, none of the four or five stories he has going in the book seem able to overcome the concepts and only Ramachandra's efforts to escape from Azlaroc seem at all interesting. Maybe if Saberhagen just used one clear plotline, he just might be able to use his concepts to make a classic. This is another of those cases in which the concepts overwhelm the story to such a degree that what happens to the people rouses little or no interest. I recommend the book for the concepts since it can be a fair intellectual puzzle.

THE ILLUSTRATED BOOK OF SCIENCE FICTION IDEAS AND DREAMS by David Kyle (Hamlyn, 1977, $9.98) might be hard to obtain unless the reader tries the specialist stores handling science fiction. The only place I've seen the book offered has been in Marboro catalogs. It is a shame because the book is as well illustrated and interesting as Kyle's previous book, *A Pictorial History of Science Fiction.*

In ten chapters, Kyle considers some of the many concepts and ideas used in science fiction. There are quotations and selections from many stories throughout the book plus many illustrations to indicate usage of the various ideas. Because of the richness of themes used in science fiction, the chapters sometimes deal with several ideas at once instead of a strict separation of one chapter dealing with one idea at a time.

The first chapter "The Electric Spark" subtitled *Voyages Extraordinarires* deals with journeys to unknown lands, expeditions to the middle of the Earth and voyages to other worlds along with a number of writers ranging from Jules Verne to J. R. R. Tolkien.

In other chapters, Kyle deals with invasions from space, different world catastrophes, gadgets such as time machines, the super discovery, the many predictions of Hugo Gernsback that are realities today, the mutants and monsters devised by various non-mad, half-mad and totally-mad scientists from this world, that world and the other world. What else should follow but robots and supermen of metallic, fleshlike or plastic composition? Finally Kyle ends up dealing with the gloomy picture of the future held by so many modern SF writers. It might be because they know so little of the potentialities of science and the scientific method. No one denies that there is misuse of science and technology. For writers to warn of these matters is right and proper. Science is not some monolithic tool that is independent of the welfare of mankind. Gloomy writers not science fiction writers but fiction writers pretending to know the human condition without truly understanding the fantastic advances that science and technology have made and will continue to make for the people on this planet.

Kyle has succeeded in offering his readers a searching and thoughtful book about science fiction. He has done it with understanding and love a combination hard to beat. Highly recommended. ■

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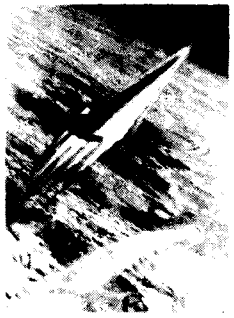

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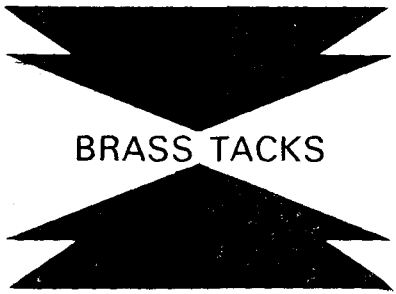

Dear Ben:

Yesterday I bought a copy of the *Analog Yearbook*. Several comments come to mind. First, the fiction. Very good. As good as I expect from authors like them. Orson Scott Card is certainly one of, if not the, best new writer we have. Has anyone else ever received a Hugo nomination for a first story? Spider Robinson is what he is. I don't think I've ever read anything by Robinson that I didn't like, and "Too Soon We Grow Old" is good if not great. Sam Nicholson was on top form, as always. And so on. An excellent collection.

The guest editorial by Benford left me more or less cold. I've heard it all before, at cons and in other places. But I suspect the editorial wasn't slanted for the long-time fen in the first place.

Now the one that hit hardest: "New Maps of Science Fiction." Several things here got to me: the 'necessity' of using a computer to analyse 3,510 bits of data. I believe that this amount of data could be analysed on a hand-held calculator at most, or with pencil and paper in the space of a week. A computer is only convenience to such a small study. I find that there is a tendency among social scientists to use allotment of computer time as a status symbol, so any calculation goes into the big number-cruncher. Secondly, the political orientation question is laughable. To use "Radical" as a political grouping, and ask the question of fanzine editors, shows ignorance of both fen and the English language. John Campbell wouldn't have let that one past. The *Pocket Oxford Dictionary* gives:

> Radical. 1. adj. (-lly) Of or from or going to or being the root, inherent, essential, fundamental, primitive, thorough . . .

In other words, the word has nothing to do with its common misuse. Especially since most self-confessed "Radicals" are good at treating the symptoms instead of the disease. I refer you to JWC's editorials on the "Now Generation," about 1966, I think, "The Lynch-Mob Philosophy," July 1969, or "The Whole World is Watching," April 1969. The second error is in assuming that fen attach the usual connotations to the word. Most of us are fascinated by the English language and tend to use dictionaries on words we think we know. (What do you think 'propaganda' means?) . . .

I liked the article, though. I do suspect that the total knowledge accu-

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mulated is very little though. All it says is that pro hard science, right wing readers like pro hard science, right wing authors. . .

HENRY GROUP

1560 Bloor St.
Mississauag, Canada

Glad you enjoyed the YEARBOOK. But please keep in mind that the sociological study of science fiction reported on how the respondents perceive the field, and nothing more.

Dear Dr. Schmidt:

Let me get to the point first; we would appreciate your including the following blurb in the first available issue of Analog:

Those who are interested in learning more about legislation before Congress regarding space exploration, industrialization, and colonization, and how to effectively state your views on these matters should send a legal-sized, self-addressed, stamped envelope to the National Action Committee for Space, Box 50011, Washington, D. C. 20004

Here's why. Several friends and I have been trying to translate some of the aspects of the future, to which we have been exposed through our interests in science fiction, into reality through legislation. (The NACS recently played a small part in the passage of the House version of H. R. 12505, Solar Power Satellite Demonstration Act, which provides for $25 million to research the idea of constructing satellites capable of converting solar energy in space into electricity and beaming it to Earth.)

The NACS is attempting to contact people who are interested in expressing their views on the space program to their Congressional delegations. A short course on writing effective letters is included in our newsletter which details the status of legislation before Congress related to space colonization, industrialization, and exploration. This service is free since the information is sent back to people in their own postage paid envelopes; the other cost of running NACS (phone, extra postage, printing) are borne by the staff. As you can see, we do not solicit funds.

We believe that the above notice carried in Analog could generate a tremendous response since the recipients very likely have an interest in what Gerard O'Neill calls the "High Frontier." A postage paid response is enclosed to facilitate your reply.

ELDON F. JAMES

National Action Committee for Space
P.O. Box 50011
Washington, D.C. 20004

Dear Sir:

I am writing in response to the State of the Art article by Lloyd Biggle, Jr. in the September 1978 issue. I have read Analog on and off for many years but have only recently become a subscriber. If no other article appears in Analog for the remainder of my subscription I feel that I have gotten my money's worth. I have never read a more scholarly article which in my opinion defends science fiction as its own genre.

Science fiction has long been explained away to me as cheap pulp, often of the Bug-Eyed Monster type. Cheaply made science fiction movies have not helped polish the image either. Most people that I run into

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these days often seem unwilling or unable to use their imaginations. Science fiction, as I see it, helps to make the transition from the present into the future a little less unfamiliar. Perhaps if more scholars of modern literature were to be exposed to quality SF writing there would be less stereotyping of it as "escapist" literature.

Please keep up the good work.

WILLIAM EBERSMAN

18 Beekman Place
Fair Lawn, New Jersey 07410

There has been a fairly scholarly journal of science fiction studies published monthly for nearly fifty years! You're reading it now!

Dear Mr. Bova:

I have been reading Analog magazine faithfully for the past eight years. In that time period, I have seen stories I like win awards and authors bloom into prominence. I have developed my own rating system for each story and article. But unfortunately, the years blur together and I seem to forget authors and stories. Is there an index of authors available? The Family Handyman has one. How about listing each author's prior contributions or issue a comprehensive index and reference guide? How else could I tell if a newly issued story or novel was the same I had read in Analog years ago but the name changed? Why not list the years of contributors in an annual issue?

STEPHEN F. SKOLITS

RD #1
Flemington, NJ 08822

Analog has not published an annual index and does not plan to in the immediate future. One reason is that we have a fixed number of pages, and publishing an index would reduce slightly the amount of fiction and articles we can print. However, the New England Science Fiction Association (Box G, MIT Branch Station, Cambridge, MA 02139) has periodically published an index giving just this sort of information for all *of the SF magazines and original anthologies.—SS*

Dear Mr. Bova:

Arthur Clarke brought to my attention the lovely letter from Juhani Rainesalb (Analog, September 1978) of the Finnish Patent Office. I am pleased to learn that I seem to have joined the distinguished group of people, including Arthur Clarke and Admiral Fiske, who have made inventions prior to the time when technology existed to reduce the invention to practice. See Leonard Lockard, The Lagging Profession, Analog, January 1961.

Excelsior.

LEONARD LOCKHARD

1284 Wheatland Ave.
Lancaster, PA

Distinguished but, alas, non-profit.—SS

Dear Mr. Bova;

In a recent editorial you mentioned the fact that there is a startlingly large number of fans that are unaware that there are magazines which print science fiction as their primary format. You also stated that these fans may also be illiterate to a certain degree. I have some factual evidence to support this.

While speaking to some friends who teach English at my old high school, I

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A Calendar of Upcoming Events

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9-11 March
COASTCON (Gulf Coast regional SF conference) at Biloxi, Miss. Guest of Honor—George R.R. Martin. Fan Guest of Honor—Meade Frierson III. Registration $7.50 until 1 February 1979, $10 thereafter. Info: Larry W. Reese, Coastcon, Inc., P.O. Box D-182, Biloxi MS 39532.

23-25 March
NORWESCON 2 (Seattle area SF conference) at Airport Hyatt House, Seattle, Wash. Guest of Honor—Philip Jose Farmer. Fan Guest of Honor—Loren MacGregor. Toastmaster—Elizabeth Lynn. Registration—$7 until 1 February 1979, $8 thereafter. Banquet $6.50. Info: Norwescon 2, Box 24207, Seattle WA 98124.

30-31 March
ORANGECON '79 (2nd annual Orlando SF conference) at Orlando, Fla. Banquet and Norton Award presentation, films, masquerade. Registration $7 until 1 Feb, $12 thereafter. Info: OrangeCon '79, P.O. Box 15072 B, Orlando FL 32858. (enclose S.A.S.E.)

30 March-1 April
LUNACON '79 (New York area SF conference) at Sheraton Inn—La Guardia, N.Y.C. Writer Guest of Honor—Ron Goulart, Artist Guest of Honor—Gahan Wilson. Registration $7.50 until 15 March, $9.50 at the door. Art show, hucksters. Info: Lunacon '79, c/o Walter Cole, 1171 East 8th St, Brooklyn NY 11230.

23-27 August 1979
SEACON 79 (37th World Science Fiction Convention) at Metropole Hotel, Brighton, U.K. American Guest of Honour—Fritz Leiber, British Guest of Honour—Brian Aldiss, Fan Guest of Honour—Harry Bell, Toastmaster—Bob Shaw. Registration $7.50 (supporting) to 31 December 1978 $15 (attending) to 31 December 1978. Info: Seacon '79, 14 Henrietta St., London WC2E 8QJ, U.K. This is the science fiction world's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition, banquet, the works. Join now and get to nominate and vote for the Hugo awards and the John W. Campbell Award for Best New Writer.

ANTHONY R. LEWIS

Items for the Calendar should be sent to the Editorial Offices, ***four months*** *in advance of the issue in which you want the item to appear.*

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was informed that a science fiction course was being offered in the last quarter of the year there. Unfortunately, the teacher, though enthusiastic, was something of a novice to the genre (ghetto) and was uncertain about the content of the course. I offered my assistance; though I have no teaching credentials, (I can't remember *not* reading SF) not long after I was invited in to speak as often as I wished. In order to determine the degree of exposure to SF that the students had experienced, I sent them a short questionnaire, one of which I have enclosed (I guess you could call it a median specimen).

The first question is the most pertinent to Analog; it asks the students to rank TV, books, movies and magazines in order from the greatest to the least in terms of what they consider as their primary sources for science fiction. Television got seven number-one rankings of a possible seventeen, movies drew five, books got four first-choice votes and magazines finished dead last with one first-place vote. And that one doesn't really count because he listed as his most recent novel readings the titles of comic books. Don't get me wrong, I like comics, *but* "The Incredible Hulk" ain't exactly *The Foundation Trilogy* either.

TV also received seven second-place votes and three thirds. Movies took eight second-place votes, three thirds and a single fourth-place vote. Books had a big two second-choice bids and ten third-place markers, with a single fourth place vote. Now, the really depressing part. Magazines were the fourth choice of fifteen of seventeen high school seniors who had specifically enrolled in a science-fiction class in a rural (pop. 3000) community. One placed it as high as third.

This is naturally not a good sample of the population to formulate any decisions or trends from, I've flunked statistics enough to know that, but it may give you some idea of what is going on in the western half of this great New York State of ours. . . .

WEINER J. SMITH

30 South Park
Leicester, NY 14481

Once the average teenager gets "turned on" to science fiction, he or she usually becomes an avid reader. Unfortunately, too many poorly-done SF classes are turning students off. And too few SF teachers themselves know that science fiction magazines are still going strong.

Dear Mr. Bova:

Anent your editorial "Dark Age" (July 1978), kindly do not harass those people who teach on the secondary and lower division levels. Your message was misdirected and the medium (Analog) was ill-chosen. Your complaint (quite justified) should go to those who control education programs and should appear in the journals that they read. Yours is a voice crying in the wilderness, but so long as you stay in the wilderness you will not be heard. It is always too late to influence the teachers, it is the teachers of teachers who must be reached.

Now your phrase "team teaching," like "team work," has a good common-sensical ring to it, quite practical and all that. But do you expect the literature instructor to teach biology while the biology instructor is teaching SF? It is no good at all saying that

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"funds should be made available," because the funds are not there and will not be made available. On the upper division level the "guest lecturer" notion is feasible, but only in small amounts. The biologists have other things to do there also.

Let me start way out in left field with an observation that may strike you to the inmost core: The business of teaching is not teaching but learning. The late L.P. Eisenhart (Princeton) put it in this fashion: The trouble with teachers is that they talk too much. There is this golden maxim for teachers—lead the student on a voyage of discovery. Wrong, quite wrong. Let the student lead, with as few nudges and shoves as possible. That sense of wonder, discovery, belongs to the student, not to the teacher.

You may think all this too remote from your editorial, but its point and thrust show clearly that you have missed entirely the role of the teacher. Of course the teacher should know, but he should not tell, if possible he should not teach.

ALEXANDER DONIPHAN WALLACE
2119 NW 21 Street
Gainesville, FL 32605

Alas, Analog is the medium we have at hand. I've spoken to groups of teachers and "educators," and while they nod spinelessly in agreement with my complaints about the low quality of SF (and other) teaching, they go right back to their classrooms and continue in the same manner as before. As for letting students lead, if you do that, why should they attend the class at all? Why not just turn them loose and let them find their own way? Think of the tax money you could save!

Dear Ben,

The case for "The Disposal of Nuclear Waste in Space" is in fact considerably better than even Michael McCollum realizes (March issue). In eliminating disposal into the Sun as impractical with chemical rockets he does not mention the possibility of using Jupiter slingshots to sling the payload back sunwards.

The relevant study I know of is "Feasibility of a Combined Jupiter Fly-by and Out-of-the-Ecliptic Mission" by G. Colombo, ESRO report SN-15 (Dec. '67), which is available on loan from the British Interplanetary Society. Where McCollum gives a velocity change of 11.86 miles per second from close-Earth orbit to solar impact, Colombo gives 15.6 km/sec (9.75 mi/sec) for the same mission using Jupiter gravity assist. Furthermore since he is discussing space probe missions he assumes as a constraint that the flight time to Jupiter should not exceed 500 days. Since that constraint does not apply to disposal missions it would be very interesting to find out whether longer flights with lower launch velocities are feasible. If in particular we can still hit the Sun with launch velocities comparable to Pioneers 10 and 11 then the delta-v required (around 4 mi/sec from orbit) is not much higher than for the lunar landing option, yet provides the politically desirable solution of permanent disposal.

I see no reason to regard the possibility as a purely theoretical exercise. In Scotland at the moment there is a major row over the intention to bury Britain's nuclear waste at Loch Doon (which just happens to be where my

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father taught me to fish twenty-five years ago.) Until now there seemed to be no better option, since Loch Doon offered the safest strata for long-term storage. If disposal into the Sun is a valid alternative, the Government would presumably be delighted to opt for it; and since it looks as if British Nuclear Fuels will be processing a great deal of other nations' wastes at Windscale, the implications could be very big with regard to Space Shuttle utilization. 'Bury it in the Sun, not in Scotland,' should become a proposal backed by all parties, as soon as possible, and I intend to start the ball rolling. I suggest that spaceflight and environmental groups in the USA start getting together with NASA and with the politicians for the same ends—a full-scale feasibility study to be followed as soon as possible by test launches, preferably with joint European and US funding. . . .

DUNCAN LUNAN,
Senior Vice-President,
European Space Association

Critics of nuclear energy who fear the long-range problems of waste disposal simply aren't taking a long-range view of the problem!

Dear Ben:

After the recent efforts to keep Skylab in orbit long enough for the Space Shuttle to do something more permanent about preventing a possible major debris problem on re-entry, I was thinking, if all else fails we might very politely ask Russia to let their "killer satellite" kill off Skylab.

BRIAN FISHBINE

If the Soviets would be so kind, Skylab could be shattered into a number of fragments, the sizes and shapes of which would determine how much longer they stayed aloft before re-entering the atmosphere. Since this is not predictable, we would be playing "Russian Roulette" in orbit!

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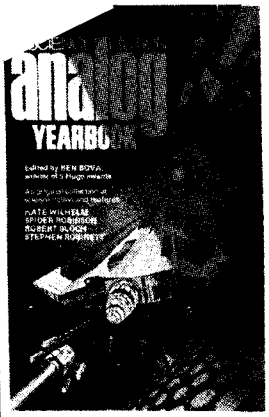

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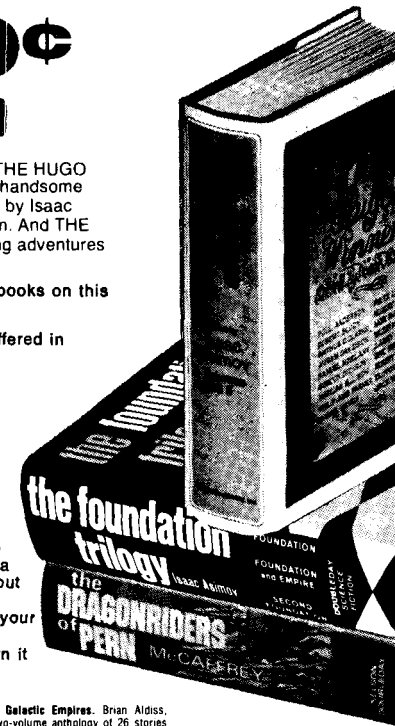

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